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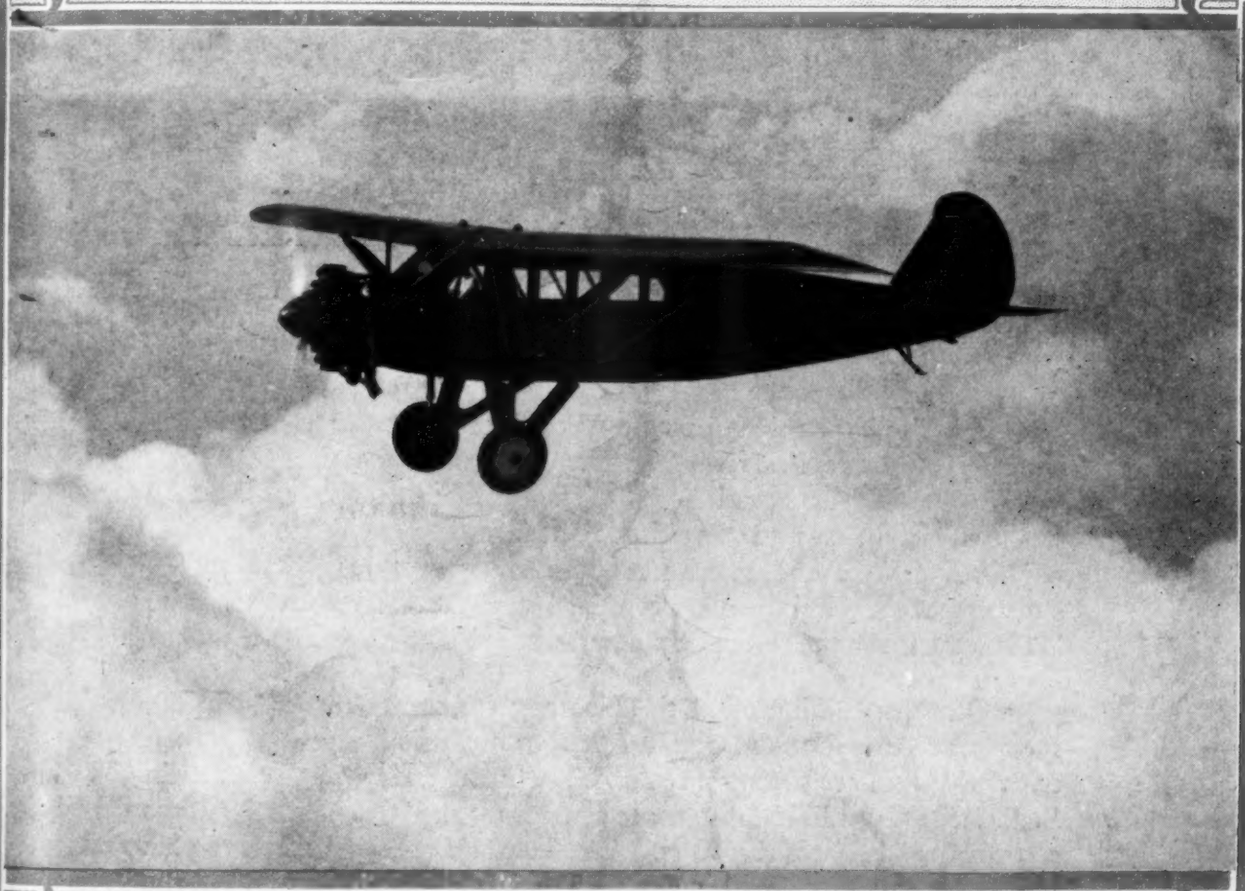
AVIATION

The Oldest American Aeronautical Magazine

August 11, 1928 | Issued Weekly | PRICE 20 CENTS



Flight picture of a Travel Air cabin monoplane at 10,000 feet.

VOLUME XXV

NUMBER 7

Special Features

The Elias "Aircoupe"

Production Planning and Control

Production in the Travel Air Factory

AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

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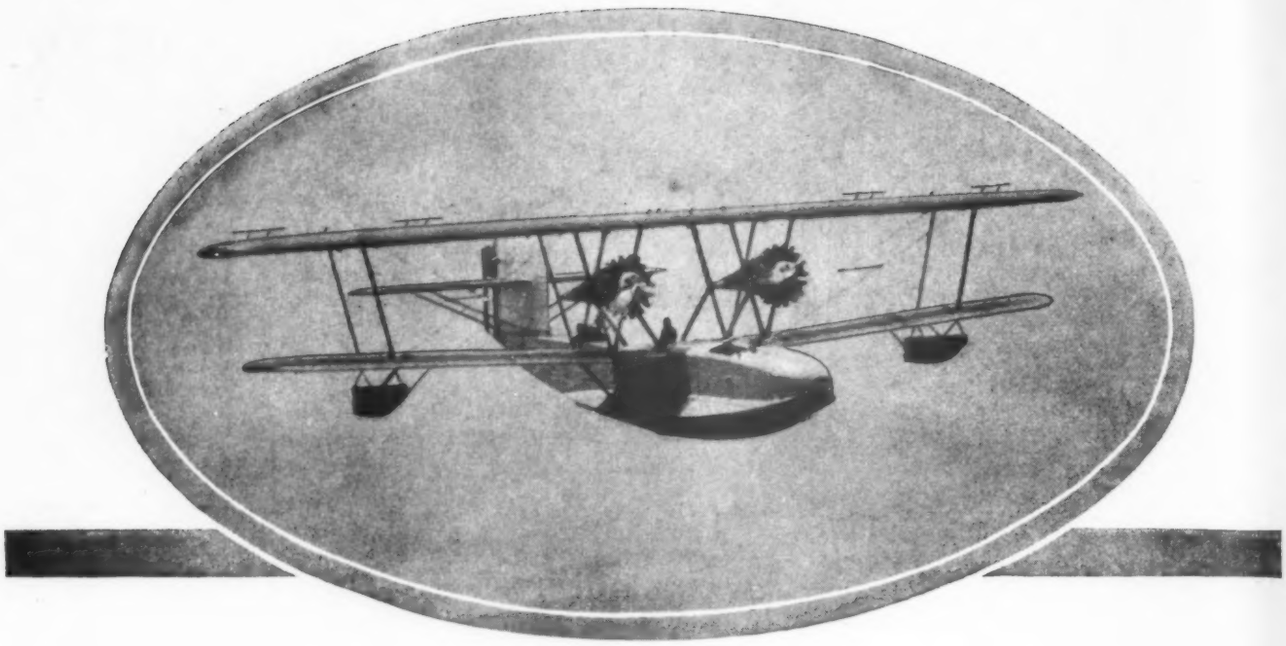

THE RECORD-BREAKING "HORNET" POWERED PN-12

MORE RECORDS FOR PRATT & WHITNEY ENGINES

It is significant that six new World's records were established when direct drive P. & W. "Hornets" were installed in the Navy's twin-engine PN-12 patrol boat. These records, made during two weeks of test flying, were for altitude, speed, range, and endurance, with pay loads of one and two tons. Previously, various water cooled and air cooled engines had been used in the PN type, but with the "Hornets" it set up an entirely new standard of performance.

On June 26th and 27th, Lieutenant Arthur Gavin, U. S. N., broke one American and one World's record for altitude. Less than two weeks later Lieutenant A. W. Gorton and Chief Boatswain E. E. Reber established one more American and five more World's records for planes of this class. The tests were flown at Philadelphia by Naval Aircraft Factory personnel who are justly proud of the splendid performance of their latest development.

"Hornet" engines are widely used by the Army and Navy, and have flown hundreds of thousands of miles in commercial service. A single transport company has in service or on order a total of more than one hundred of these engines.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

S A F E . . . S W I F T . . . S-M-O-O-T-H . . .

Maj. Gen. John F. O'Ryan, President of the Colonial Western Airways, Inc.

TRANSPORTATION . . . OPERATION

Is there a more exacting test of the capabilities of an airplane than the requirements demanded by regular —safe . . . swift . . . smooth . . . transport operation?

Carrying mail, express and passengers . . . in winter and in summer, in rain, in snow, in fog—over lakes, forests, rivers, and plains, day and night, month after month, maintaining an on-time schedule geared with the wheels of commerce and industry . . . requires an airplane of efficient design and reliable construction.

In fulfilling their appointed tasks, Fairchild Cabin Monoplanes are serving thirty transport operators—covering the continent of North America★

That Fairchild Monoplanes have earned by proof of *past and present* performance the acknowledged regard of the organizations which employ them in their transport services is reflected by the commendation of Major General John F. O'Ryan, President of the Colonial Western Airways, Incorporated: "Safe . . . Swift . . . Smooth—my verdict on the Fairchild which carried me from Albany to Buffalo on the opening day of the Colonial Western Line. Congratulations to the manufacturer, Sherman M. Fairchild, President." Fairchild Airplane Manufacturing Corporation, 270 West Thirty-eighth Street, New York City.

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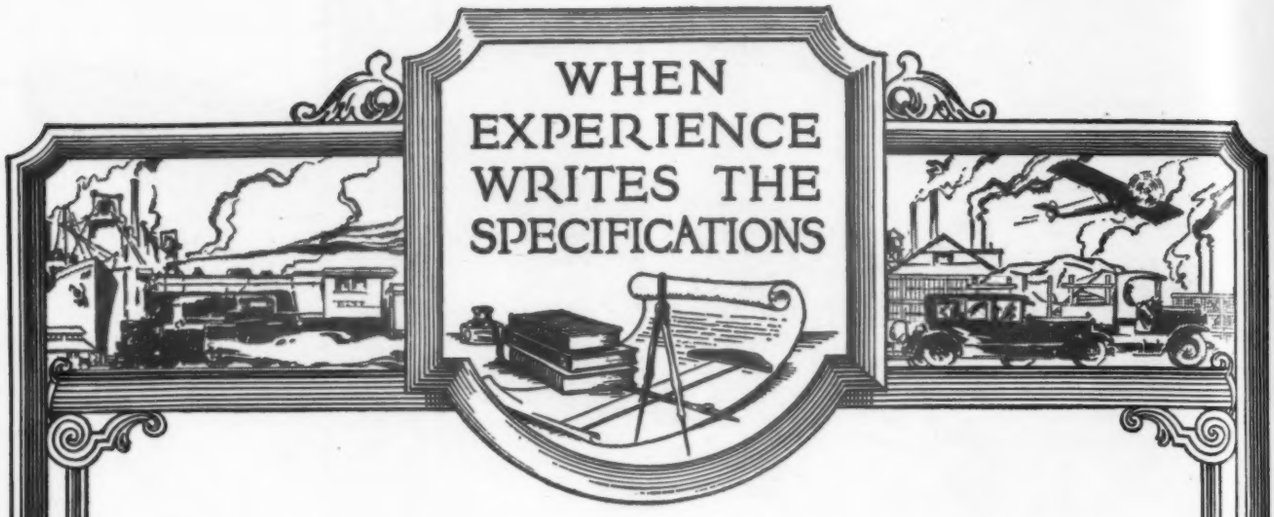


CURTISS AEROPLANE & MOTOR CO., INC.

USE NICKEL ALLOY STEEL FOR VITAL PARTS OF CURTISS D-12 ENGINES

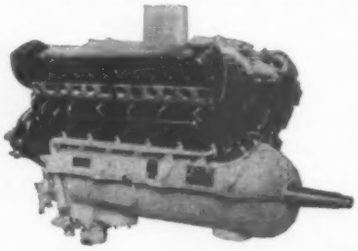
NICKEL ALLOY STEEL PARTS OF CURTISS D-12 ENGINE

- Crankshaft
- Connecting Rods
- Connecting Rod Bolts
- Camshaft Driveshaft
- Magneto Driveshafts
- Pumps Driveshaft
- Oil Pump Shafts
- Water Pump Shaft
- Vertical Driveshaft
- Pistons
- Gears
- Nuts
- Thrust Bearing Locknut
- Studs
- Piston Pins
- Wrist Pins
- Bolts
- Propeller Hub

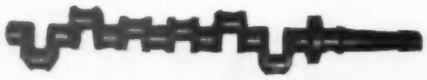
THE First Pursuit Group, U. S. Army Corps, equipped with Curtiss "Hawks", powered by Curtiss D-12 Engines, is the crack Pursuit Group of the U. S. Army Air Corps. Nineteen of these pursuit planes recently made a flight from Selfridge Field, Detroit, to Kelly Field, Texas—1,400 miles in approximately 13 hours. They flew on schedule in perfect formation in poor weather, without a single mechanical breakdown in any motor.

In all Curtiss D-12 Aircraft Engines, vital parts are made of Nickel Alloy Steel. This instance of Nickel Steel performance is typical of a wide range of other industrial applications where the superior qualities of these Alloys have established many records for utmost dependability.

Information regarding these uses of Nickel Alloys will be gladly furnished by our staff of engineers.



435 H. P. Curtiss D-12 Airplane Engine



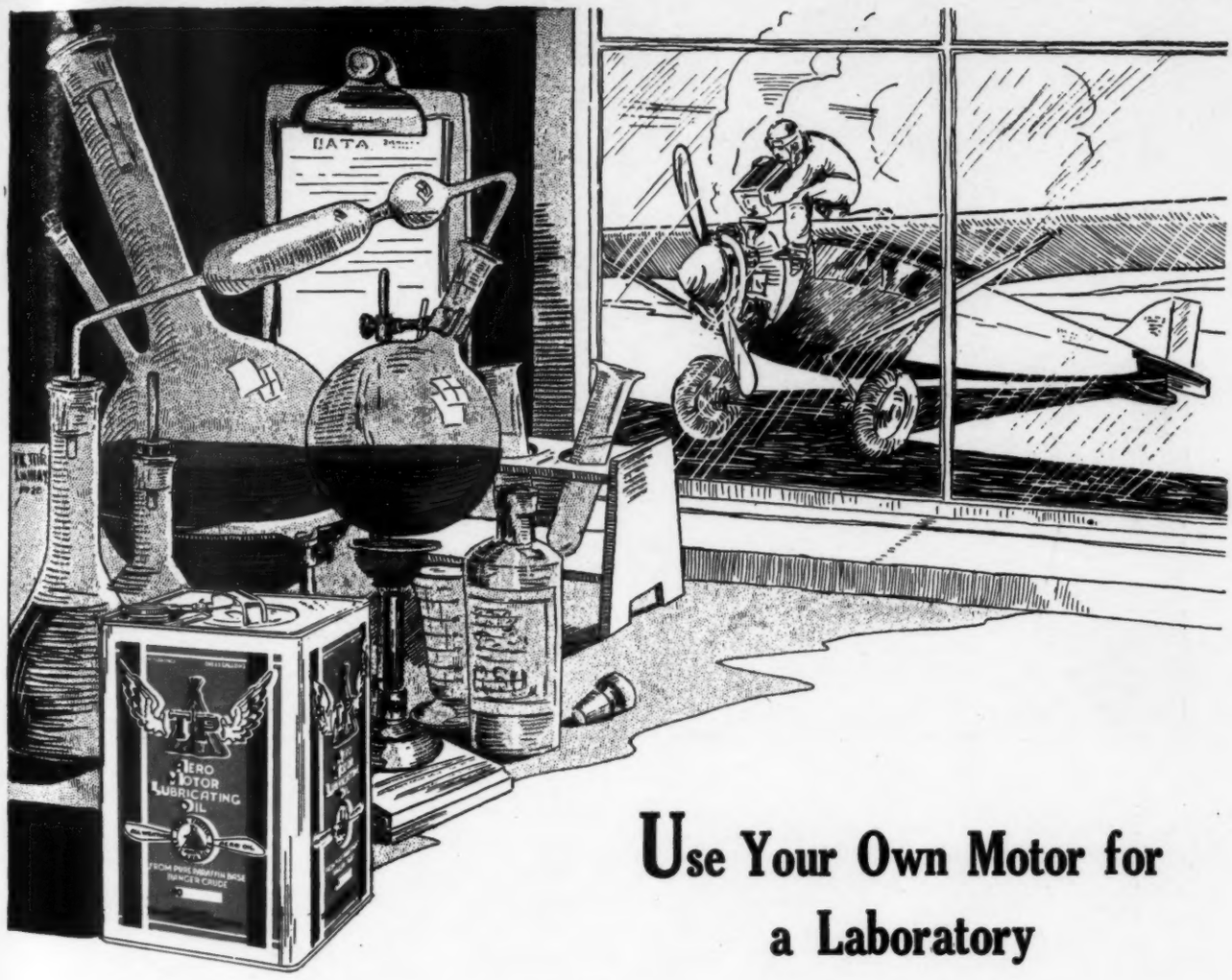
This forged Nickel Alloy Steel crankshaft, used in Curtiss D-12 engine, weighs 61 lbs. and transmits 435 H.P., slightly over 7 H. P. per lb. of weight.

Send for "Buyers' Guide to Nickel Alloy Steel Products"

FOR STRENGTH WHERE THE STRESS COMES — NICKEL STEEL

Nickel
FOR ALLOY STEEL

THE INTERNATIONAL NICKEL COMPANY (INC.), 67 WALL STREET, NEW YORK, N. Y.



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Aero, the original Wax Free Paraffin Base oil, will give you more and safer flying hours at less cost. Impose your own conditions, make your own tests.

You will find the amount of Aero consumed per flying hour is less, the r. p. m. of your motor is greater, its oil pressure is greater, this oil pressure is maintained, its flexibility is greater, it has less ignition trouble from thinned out oil and fouled spark plugs. You will find many other advantages of Aero, the all weather lubricating oil.

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The Martin 74, all-metal, air-cooled, three-purpose plane — reconnaissance, bombing and torpedo—for naval or military use.

The "Impossible" Achieved!

MARTIN U.S.A. TRADE MARK

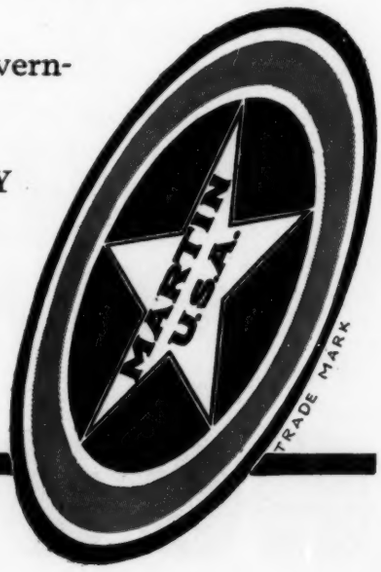
EVEN within the Martin organization there were many who believed we had set our standards too high when we began to plan the "74". To build a ship which would be successfully engineered against the strains of flying, of landing against an aircraft carrier's arresting gears, of catapult launching and of landing on either pontoons or land gear—and yet carry a full load of bombs or torpedoes, a crew of three men and full armament, all in addition to fuel capacity for 850 miles of flight,—this apparently foretold an unwieldy plane. The actual result has astonished the entire aeronautical world.

The "74" is as active as a combat plane. Its improved control answers to two fingers. Its take-off, light, is reduced to six seconds. The powerful control of pilot over plane is a revelation. In every detail it establishes new standards of safety, durability and dependability. One-hundred-and-two of these planes, designated as the T4M-1 series, are being delivered to the U. S. Navy, all of whose bombing and torpedo squadrons are Martin-equipped.

The Martin 74, culmination of an intensive four-year development program on bombing planes, is the latest achievement of the foremost builder of large planes in the United States. No comparable three-purpose plane is in the air.

The Martin 74, is available to other governments. Correspondence is invited.

THE GLENN L. MARTIN COMPANY
Builders of Quality Aircraft Since 1909
CLEVELAND, OHIO, U. S. A.



U S S. Los Angeles flying over Panama Canal Zone

THE name Goodyear has long been coupled with aerial science.

Goodyear balloons have made hundreds of flights to assist man's exploration of space.

Goodyear has pioneered in the development of airplane tires and has won the confidence of pilots everywhere.

Goodyear has constructed 29 airships, and has furnished parts for 86.

Goodyear observation balloons sentineled the allied front.

Goodyear has developed and perfected many items of rubber for airplane equipment, notably a safety gasoline tank cover.

Five years ago Goodyear obtained from Europe patent and process rights to gain dirigible supremacy for America.

Goodyear men have always given unstintingly of toil, skill, and even life, to the progress of aviation.

Goodyear stands ready to do anything within the power of the world's greatest rubber company to further the commercial success of both lighter- and heavier-than-air operations.

"AMERICA MUST BE FIRST IN THE AIR"

P. W. Litchfield

GOODYEAR

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Specialization in lubrication that is unrivaled

For 63 years the makers of Mobiloil have specialized in one field—lubrication.

When you use Mobiloil in your plane it means that you are getting an oil—

1 made from crude stocks carefully selected for lubricating value—not high gasoline yield.

2 refined by specialized processes to bring out this rich lubricating value.

3 put through 3 times as many steps in its manufacture as many oils offered you.

4 costing twice as much to make as many oils.

5 verified for correctness and quality in the most modern lubrication laboratory—the Mobiloil Laboratory at Paulsboro, N. J.

These facts are worth the attention of every pilot. They explain why you can always feel sure with—

The World's Quality Oil

Mobiloil

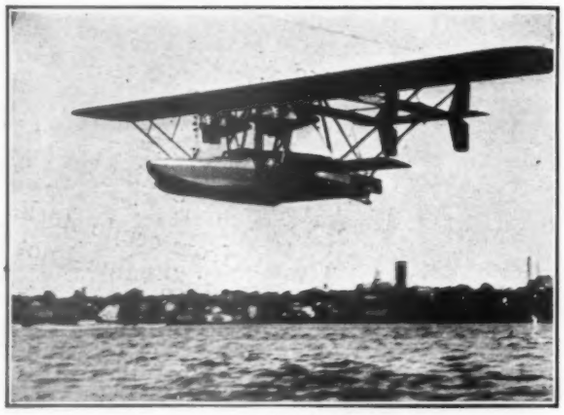
VACUUM OIL COMPANY

Look for the red Gargoyle trade-mark on the Mobiloil container

"Land When and Where You Wish"

On LAND

On SEA



In FLIGHT

Sikorsky Amphibian

Type S-38 Model 1928 Powered with two Wasp Engines

The Sikorsky Amphibian S-38 is guaranteed to have a ceiling of *over* 20,000 feet, a guaranteed high speed of *over* 125 m.p.h., and is guaranteed to fly on one engine with pilot, nine passengers, and gasoline for five hours' flight.

With a cruising speed of 110 m.p.h., and ability to land not only on land, but on water, in the very heart of such cities as New York, Buffalo, Detroit, Chicago, etc., the S-38 is the fastest ship in the country for communication between cities. No amphibian has ever offered performances, comfort and safety approaching those of the S-38.

NOW BEING MANUFACTURED AND DELIVERED

SIKORSKY MANUFACTURING CORPORATION

COLLEGE POINT, LONG ISLAND, NEW YORK

AIRWAY MAP OF THE UNITED STATES
Ready in August!
AIRWAY UNDER MAIL CONTRACT
AIRWAY UNDER MAIL CONTRACT BUT NOT YET OPERATING
AIRWAY ON WHICH MAIL CONTRACTS ARE ADVERTISED OR PENDING
AIRWAY PROPOSED
PASSENGER OR EXPRESS ROUTE OR BOTH

THE PITCAIRN SUPER - MAILWING

Air mail poundage is mounting rapidly. To meet the demand for a high-speed ship capable of carrying the ever-increasing loads, the Super-Mailwing (PA-6), has been designed and will be ready for delivery to operators early in August.

The plane has a cargo space of forty cubic feet, nearly twice the capacity of the Mailwing (PA-5) and can accommodate 500 pounds of mail. This has been accomplished by an increase of only twelve inches in the over-all length of the ship. Gasoline capacity has been increased twenty gallons, with a commensurate increase in oil capacity. The plane is fitted with a regular army type adjustable pilot's seat permitting greater visibility for take-off and landing. Other features and refinements include improved fuselage lines, semi-enclosed exhaust manifold, and a new undercarriage design resulting in performance characteristics comparable with the Mailwing (PA-5). Comparative specifications are as follows:–

	PA-5 Mailwing	*PA-6 Super-Mailwing*
Wing Span . . .	33 ft.	33 ft.
Overall-Length .	21 ft. 10½ in.	22 ft. 10½ in.
Mail Capacity . .	21½ cu. ft.	40 cu. ft.
Gasoline Capacity	56 gal.	76 gal.
Oil Capacity . .	5½ gal.	7½ gal.
Wt. Empty . . .	1742 lbs.	1840 lbs.
Engine	Wright J-5-C	Wright J-5-C

We shall be pleased to submit other specifications and performance data on request

PITCAIRN AIRCRAFT INC.

LAND TITLE BUILDING - - PHILADELPHIA

THANK YOU for mentioning AVIATION

It was hot enough to boil eggs

yet his motor kept in perfect action with Kendall Penzbest Oil

C. P. MAYER, Pres. — J. WARREN SMITH, Mgr. — E. P. JOHNSON, Sec'y.

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Gasoline and Oil Available on our Field
General Repair Service on ANY Make of Plane

BRIDGEVILLE, PA.
March 24th, 1928.

Kendall Refining Co.,
Bradford, Penna.

Gentlemen:

I returned yesterday from San Diego with the new RYAN and was very much pleased with the action of same. I flew the entire distance with perfect ease feeling my motor was in perfect action with Kendall "G" Oil.

It is the best oil I have ever used. I started out through the desert and the temperature was so hot it seemed to me that it would boil eggs. The temperature was always in the neighborhood of 110 degrees.

My oil pressure dropped back about three pounds and it never reached over 140 degrees Fahrenheit. I used considerably less Kendall Oil than any other make I have used in like trip.

It is indeed with pleasure that I recommend Kendall "G" for use in Whirlwind Motors.

Yours very truly,

MAYER AIRCRAFT CORPORATION,

By J. Warren Smith
MANAGER & CHIEF PILOT.

AGENTS FOR

TRAVEL AIR MFG. CO.
Manufacturers of Travel-Air Planes

IN torrid climates Kendall Penzbest Oil is proving its superlative ability to resist heat and wear. Read the letter. It tells a story of performance that is typical.

Why is Kendall Penzbest slow to breakdown under heat? Because it is derived from 100% *Bradford* grade of Pennsylvania crude, the world's finest grade. Because every particle of wax, which thins out quickly at high temperatures, has been extracted; because no acid is introduced during its refinement and purification; because it contains no impurities to weaken its body or hasten carbonization.

That is why Kendall Penzbest stands up, in summer and in winter. That is also why it is a waste of good oil to drain Kendall Penzbest as often as you do other oils. Pilots using Kendall Penzbest accustom themselves to prolong the draining interval, often to an average of 30 hours.

Try Kendall Penzbest on your next flight. Your engine will perform better regardless of the weather. You will check all risk of trouble due to inferior lubrication. Starting will be easier, compression improved, power increased. If you would like to know the "hows" and "whys" .... let us send you a copy of *Ground Flying on the Subject of Lubrication. Address* Aviation Division, Kendall Refining Company, Bradford, Pa.

We will exhibit at the *Aeronautical Exposition*, Los Angeles, Sept. 8 to 16

BUY AT THIS SIGN
KENDALL
PENZBEST
MOTOR OILS
AT ITS BEST PROTECTION

KENDALL PENZBEST MOTOR OIL

100% BRADFORD GRADE OF PENNSYLVANIA CRUDE

THANK YOU *for mentioning* AVIATION

FOLLOW THE SWALLOW

PIONEERS BOTH

E. A. Johnson, of the Johnson Flying Service, Inc., Dayton, Ohio, started in the airplane business way back in 1919. The same year saw the beginning of the Swallow Airplane Company at Wichita.

Since his start, Mr. Johnson has carried over 55,000 passengers without a single accident to either passenger or pilot. Since its humble beginning, Swallow has built up a name for stability, service and safety that is not even approached by any other plane.

What more natural than that these two Pioneers should join hands! Mr. Johnson is the representative in the Dayton trade territory for the Swallow, and is looking forward to 1928 as his biggest year by a wide margin. Certainly, in the Swallow, he is offering his trade a splendid value; a plane which will surely help him to accomplish his aims for this year.

Swallow offers three different types of motors as standard equipment—the old reliable OX-5 (of which we have a supply of new ones still on hand), the Wright Whirlwind, and the 150 H.P. Hispano-Suiza, illustrated above. Write or wire us for full details and dealer proposition. There are still some good territories available for the right men.

VICTOR H. ROOS, General Manager

SWALLOW AIRPLANE CO.

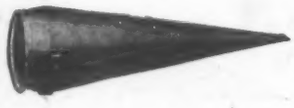
WICHITA, KANSAS

PIONEER *Navigation and Landing Lights*

Proper Navigation lights are required by Federal Law. Install Pioneer Navigation Lights and then forget about specifications. Pioneer Navigation Lights are extremely light in weight, and fulfill all government requirements.

Each Pioneer Landing Light throws a 260,000 candle power beam. Objects a mile away are seen distinctly. Pioneer Navigation Lights and Pioneer Landing Lights are sturdily built. They render service in keeping with the reputation of the other members of the Pioneer line.

Full particulars sent on request.



The
PIONEER LINE

Check the items in which you are interested, tear out the list, mail it to us, and we will send descriptive folders.

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- Flight Indicator ☐
- Fuel Level Gauge ☐
- Fuel Pressure Gauge ☐
- Fuel Strainer ☐
- Hand Fuel Pump ☐
- Holt Flares ☐
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- Landing Lights ☐
- Navigation Lights ☐
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- Oil Pressure Gauge ☐
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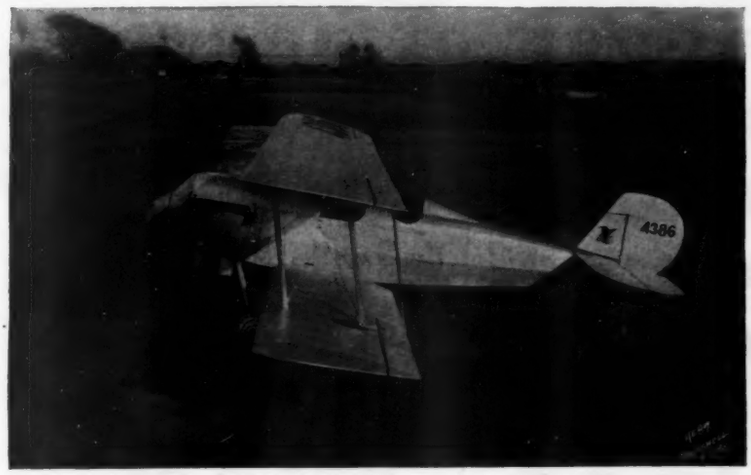
A *Striking* INCREASE *in* PRODUCTION *of* American Eagle Planes!



THIRTY days ago the American Eagle Aircraft Company announced facilities which made possible immediate delivery of American Eagle planes.

You will be surprised to learn how quickly the industry reacted to that announcement . . . and how it has reflected in increased activity in the sales organization.

That announcement was merely the first of a number of important announcements to be forthcoming within the next sixty days. See the American Eagle dealer nearest you . . . or write for interesting information.

See the American Eagles at the National Aeronautical Exposition in Los Angeles, September 8-16

American Eagle Aircraft Co.

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OX5. 90 h.p., $2,985; Hisso Model A, $3,500; Ryan-Siemans, 97 h.p., $4,400; Quick, 125 h.p., $4,150; Anzani, 120 h.p., $4,800; Hisso Model E $3,850; Ryan-Siemens, 125 h.p., $5,825; Salmson, 120 h.p., $5,650.

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The Fourth National Air Tour was a general performance competition between many types of airplanes—of high and low price

Waco Won

Reasonably prompt deliveries can now be had on Waco's with OX5, Ryan-Siemens, Hisso and Wright Whirlwind motors. Type Certificates 9, 13, 26, 41, 42

WACO AIRPLANES

The Advance Aircraft Co.
Troy Ohio

THANK YOU for mentioning AVIATION

Perfect lateral control

ALEXANDER EAGLEROCK

TRADE MARK REG.

With One Finger

"Of all planes I have flown, this new EAGLEROCK is the biggest surprise to me. Its perfect lateral stability and ease of control is a revelation.

Even at stalling speeds a slight one finger touch on the stick brings immediate response—resulting in a feeling of security and perfect confidence in my ship.

It's a marvel."

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Los Angeles, California

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La.—Louisiana Airways, 1711 Pere Marquette Bldg., New Orleans
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Georgia and So. Carolina—Williams Flying Service, Box 1319, Greenville, S. C.
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N. E. Ind. & W. Ohio—Ind.-O. Aero Corp., 203 Carroll Bldg., Ft. Wayne, Ind.
No. Illinois—Jack Oates, Inc, 5101 W Madison, Chicago
E. Wash. & N. Idaho—Inland Eaglerock Aircraft Co., Greenacres, Washington
Oregon—Oregon Eaglerock Sales Co., Klamath Falls, Ore.
Minn.—Minnesota Aircraft Co., 406-8th Ave., Minneapolis
Miss.—Sellers Motor Co., Box 622, Jackson, Miss.
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Southern Iowa—Dodson Aircraft Co, Kirksville, Mo.
Alaska—Meals Eaglerock Sales, Valdez
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EAGLEROCK is now built with detachable motor mount and any motor, 90 to 260 h.p. can be used. It has a SAFETY FACTOR OF 8 PLUS. Price—Figure factory base price of EAGLEROCK at $2250 less power plant and propeller but with cowling, motor mount and standard equipment; add price of power plant and propeller you select.

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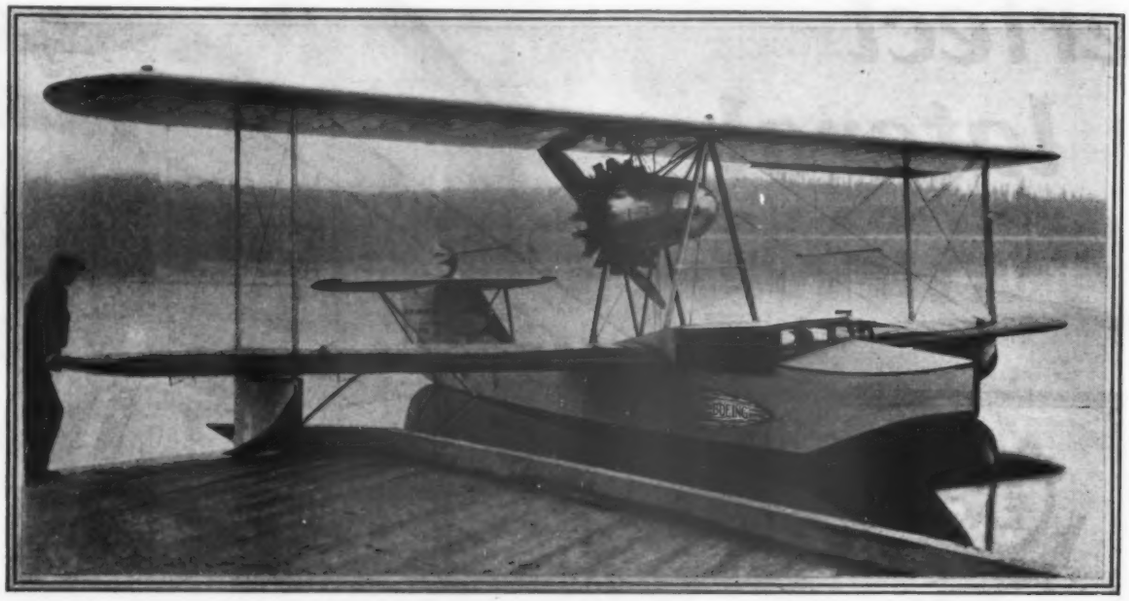

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AVIATION

The Oldest American Aeronautical Magazine

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HERBERT F. POWELL, *News Editor*
ALBERT F. MULLADY, *Asst. Business Manager*
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Vol. XXV *August* 11, 1928 No. 7

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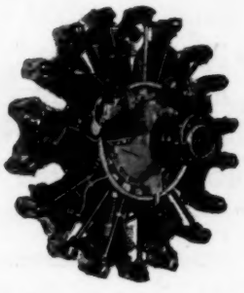

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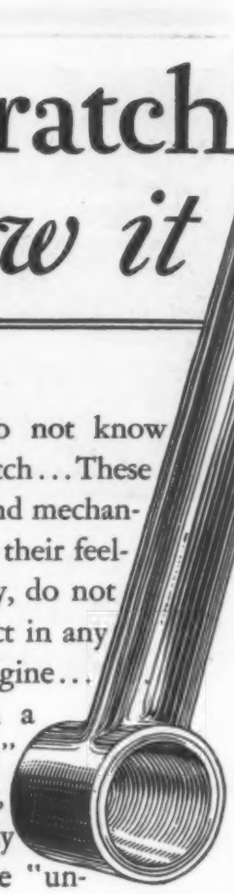


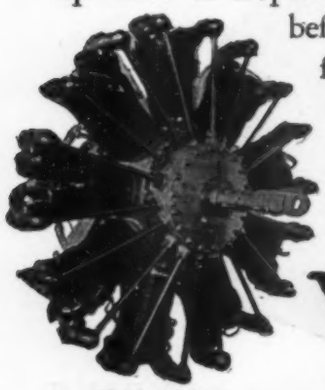
WRIGHT Workmen do not know how to "fix" a scratch... These men, whose high technical and mechanical skill is supplemented by their feeling of personal responsibility, do not know how to remedy a defect in any finished part for a Wright engine... Their only comment when a flaw is met is "throw it away"... A scratch however slight, a defect visible perhaps only through a microscope, is the "unlocked door" toward which stresses in the metal might strain for release.

That is why visitors to the Wright plant see discarded finished parts—to the average eye perfect in every detail—but to the searching eye of a Wright inspector unfit for service.

Nothing is left to chance in building Wright engines. Every operation is done by an expert in that individual field; every operation is inspected by another expert, before the completed, perfected and approved parts are accepted for assembly... There is no secret behind the performance of Wright engines. Every part in the Wright engine bears the Wright name. Every part in the Wright engine is as important as every other part. Every part in the Wright engine is the individual product of specialized workmen who know that the slightest departure from the highest standard may wreck the whole.

Every part in the Wright engine is sound, solid, tested and retested, made from the start to be tougher than the service it must give, and built from rough stock to assembly with full knowledge of its important function in the completed engine. Exactly what Wright engines will do is known.

For more than a decade Wright has been building engines with just such care as this... to produce aircraft power plants that measure up to the highest standard of excellence... an unchanging policy which explains Wright engine performance. That is why "more pilots fly them".



Wright "Cyclone" Aeronautical Engine

That's why More Pilots fly them!

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THANK YOU *for mentioning* AVIATION

AVIATION

The Oldest American Aeronautical Magazine

Vol. XXV ***AUGUST 11, 1928*** **No. 6**

Maj. Lester D. Gardner

EVER SINCE AVIATION was first published, the name of Maj. Lester D. Gardner has appeared either as the publisher or a member of the staff. Last year, after he had sold all his interests in the company to his associates, they requested that his name be allowed to remain as a Director, although he was no longer actively connected with AVIATION.

Major Gardner's election as President of the Aeronautical Chamber of Commerce of America places him where any responsibility, however remote, for the opinions expressed by AVIATION might be embarrassing to him if his name remained on the magazine. As is well known, his vigorous comment on the trend of aeronautics for the last twelve years has played an important part in the sound development of the art as well as the science. As spokesman for the aeronautical industry of the United States he will naturally desire to be free from all connections which might in any way limit his usefulness to the group that has honored him. With great regret, at his request, we remove from our editorial "masthead" the name of the founder of the magazine.

We congratulate Major Gardner on the well deserved honor that has come to him. The staff of AVIATION, through many years of personal association, knows of the unselfish and impersonal aspirations that he has always had for the aeronautical industry. He has written a record of its progress in these pages, fought its battles and praised its achievements. We are therefore, in a peculiarly fortunate position to congratulate the industry as well, in choosing Major Gardner to guide it through this important year of expansion. The problems that confront it will now require for their solution, experience, judgment and an unselfish willingness to do a difficult task, and there is no one better qualified than Maj. Lester D. Gardner.

Profitable Weather Reports

EVERY ONE is interested in weather reports but their cash value to ordinary mortals has not been very great. As a result the weather bureau organization has been built up only to a point where it can predict general conditions, and even in this it is often in error. It is quite generally admitted, however, that with a sufficient number of observation stations, sending out numerous reports that are really accurate, forecasts could be made.

At the present rate of growth of air transportation the time is not far distant when a very elaborate system of weather reporting will pay for itself many times over. For example, a regular air mail route is often blocked by storm or fog conditions, but it is very rare when there is not a way through within a hundred miles of the regular course. As the volume of traffic gets larger, being able to get through will mean enough revenue to pay for a week's expense in getting detailed weather reports.

The present experiment of weather reporting which is being tried out on the Los Angeles-San Francisco air line under the auspices of the Guggenheim Fund should prove of very great interest and it is to be hoped that they will be able to prove that local weather reporting can be made both accurate and profitable. One wonders however, what Californians are saying about having their state selected as being the most suitable place for reporting bad weather.

Let Them Have It

FOR MANY years those in the manufacturing end of the aircraft industry have been working extremely hard and with very little if any help from outside sources. Several concerns have built up a large amount of business, especially plants doing military work, and their success is the result of the efforts and ability of the men at the helm. After such long and bitter struggles as most of these men have gone through it is only natural that they should feel a certain sense of scorn for those who now so profusely offer their help, and it is also natural that they should, as a matter of pride, desire to maintain their hard won independence.

However, conditions are changing. The struggle for mere existence is becoming an equally bitter competitive struggle. There will be an ample volume of business to be shared, but it will take just as much energy and ability to stay in the running as it did when the volume was small. The main difference will be that money for expansion is now available and that getting into production and establishing a widespread system of distribution and service will be absolutely essential. To handle this, large amounts of capital will be needed, especially for the commercial manufacture. It will go against the pride of many a man who has built up his business solely through his own efforts to consolidate with other firms, or to bring in outside capital which will interfere with his independence, but in many cases it will be the part of wisdom to do either.

There is little doubt but that the aeronautical field will to a certain extent, follow the history of the automobile field where mergers, consolidations and changes of ownership have been the rule. Now that outside capital is anxious to get into the field, there is a real opportunity to capitalize the efforts of previous years even if it means the sacrifice of complete personal control. The next few years will undoubtedly see many and rapid changes and to a large extent the management of the aeronautical industry will pass into new hands.

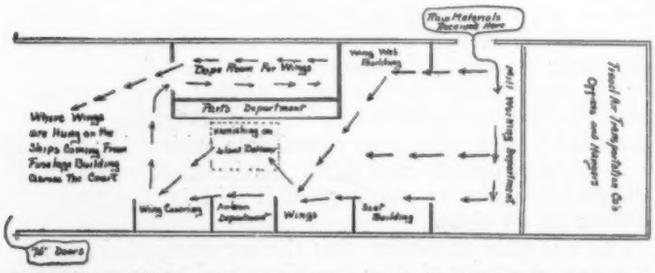
Production *in the* Travel Air Factory

BY WILLIS PARKER

THE factory of the Travel Air Manufacturing Co., Wichita, Kan., is in two sections. The two buildings, each 75 ft. wide and about 250 ft. long are set end to end so that they are, to all intents and purposes, one long building with an open court in the center. Raw materials enter the factory at the extreme ends of the buildings, and flow toward the center where the fabricating streams merge into completed planes, which are rolled from the open court between the two buildings to the flying field where they are test flown. From there the planes go either to the hangers for delivery to purchasers within a few days, or take the air and fly to their new homes.

The construction of the factory, the location of the machinery, and the movement of the raw materials through the shops to the final assembly are most interesting to all who visit the plant. Correct distribution provides for the continuous motion of raw materials through the fabrication processes with no halting at the shipping room door for the sales department to catch up with production. Under present conditions, there is no difficulty on the part of the Travel Air sales department in maintaining a pace equal to, if not ahead, of the manufacturing units. But manufacturers must watch lest there be a temporary stoppage of materials in the plant. It is in such stoppages that dollars and cents are lost.

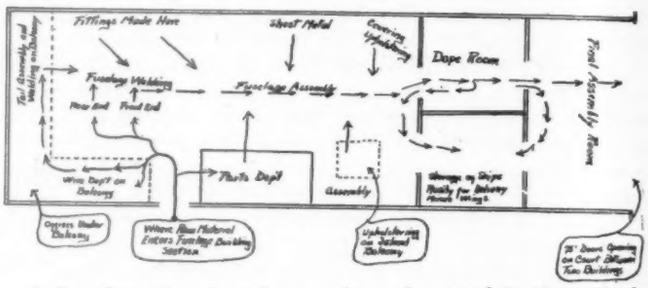
The Travel Air Plant and system of manufacturing eliminates the "dams." The moment a piece of raw material is drawn into the maw of this manufacturing structure, it keeps on moving to emerge into the sunlight again as a part of a finished plane. In theory there are no



A drawing of the wing construction building of the Travel Air Company

stock rooms in which materials may enjoy a temporary respite. They must keep moving. To better explain, we will take each of the two buildings separately and describe the production current therein. The first building is a metal working section wherein the fuselage is constructed, painted, upholstered and covered and the engine installed. The second building may be termed a wood working building for it is here that the wings are made, covered and painted.

Let us consider the metal working building first. At the extreme end of this structure—that farthest from the other building—but on the side, is a wide door where raw materials are received. Suppose that a load of tubing is delivered. It is taken by two workmen stationed



A drawing showing the routing of materials through the fuselage construction building

near the door, and rushed to a saw where it is cut into lengths desirable for fuselage frames, and is then placed in racks near the jigs where the frames are welded.

If it is a shipment of wire which is received it is sent to a balcony that extends from a point near the receiving door to the end of the building and around the other end about half way. The general offices of the company are situated under the balcony, but are separated from the factory by sound proof walls. One portion of the balcony is devoted to the construction of tail assemblies and the other to the manufacture of the wires used in the planes. The tail assembly department has its own welding apparatus and jigs and never interferes with the fuselage frame construction and welding. From this balcony, the processed materials flow downward and into the production line.

We must "back-up" partly in our statement and admit that there are some materials, semi-processed or completely constructed, that are not manufactured at this plant and therefore are unloaded at the parts department, which is near the receiving entrance. Such items as screws and bolts are included in the parts department which is directly in the center and on one side of the metal working building. The position of this department reduces the number of steps required of the workmen walking to and from their benches for these small items. Bolts and crews might be classed as other than raw materials, but we will consider them semi-finished materials, or finished parts since no machining processes are necessary to make them ready for the production line.

The production line in this building flows from west

to east. In the northwest corner of the building is the section devoted to the construction of fittings. Near it on the north side, is the section known as the sheet metal department. Next to it is the covering and upholstering department. Then next in line is the dope room, separated from the main factory by fire walls and fire door. The assembly line runs down the center of the building and the various unites into the line from either side. This eliminates unnecessary movement of materials.

Returning once more to the upper end of the assembly line, we find that the frame work of the fuselage is started in two sections on jigs stationed parallel to the production line, but a few feet to the south of it. One section is the rear end of the fuselage and the other the forward portion. These sections are moved into the main line, brought together and are welded, and are moved down the line were additional bracing and rigging is put on.

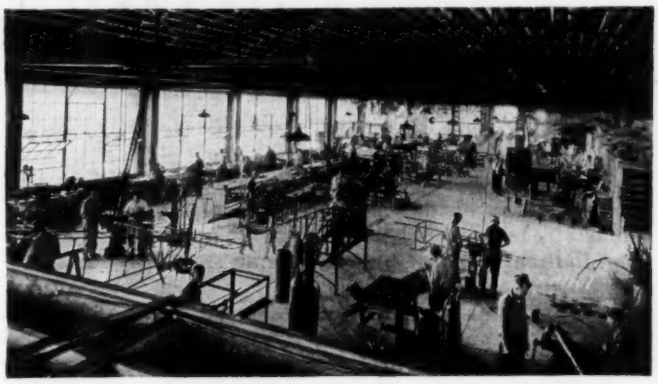
Use Made of Ceiling Space

A unique feature of the building is the utilizing of ceiling space for the various smaller departments. They are arranged somewhat like islands in the air and are about 30 ft. square. On them workmen construct the sub-assemblies and do portions of the work necessary on the fuselage when it reaches a point in the assembly line near their "islands." On one such island is a portion of the upholstering department.

The finished fuselages may be sent to one of two places at the end of the assembly line. If the plane is not to be delivered immediately, it may be backed out of the dope room and moved forward into a space designated for the storage of planes ready for delivery. If it is to be delivered immediately, it may be run through the opposite end of the dope room to the final assembly department which opens into the court between the two buildings. There it meets the wings coming from the other building.

Raw material enters the second building—the wood working department and wing section—at the eastern end of the building. If it is lumber, it is cut into the required lengths, passed through the band saws and planers, and is started on its way toward the west end of the building. Some of it goes to the wing-web section, which is on the north side of the room. Some of it moves westward along a fairly straight line where it is assembled with the wing webs into the complete wing framework, going to the varnishing "island," located above the floor in the same manner that the islands are situated in the other buildings. From there, the frame work is dropped down to the wing covering department, and then into the dope room, after which it moves toward the court.

The wing framework is elevated to the varnish "island" by pulleys, which also run on tracks. One might term it a sort of inclined railroad. From the varnish island, the wings go to a space above the wing parts department



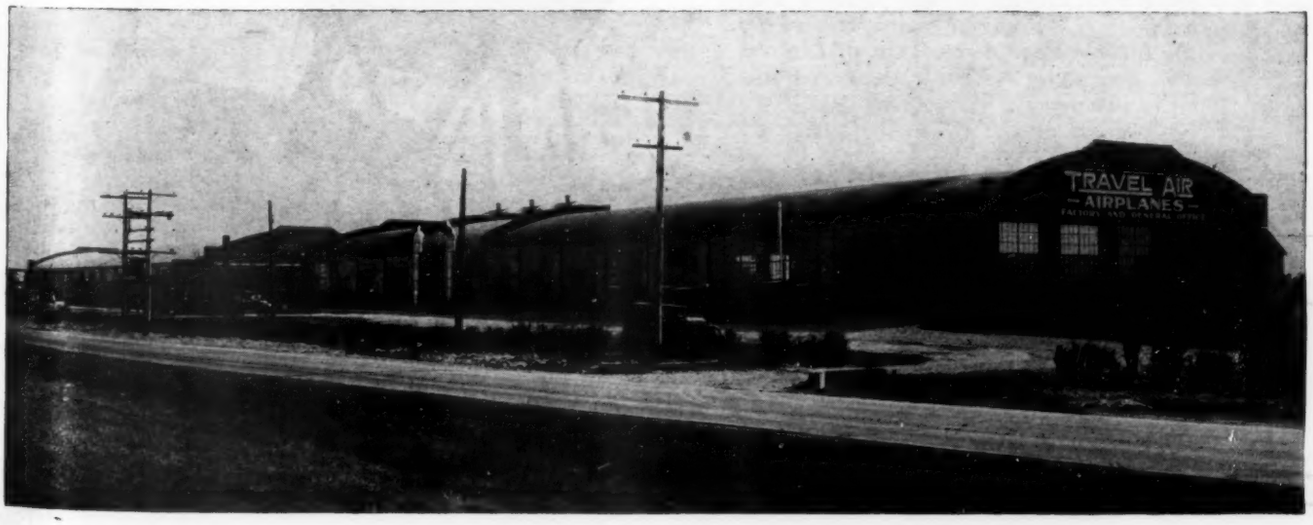
A section of the fuselage welding and assembly building

to dry. From there they move to the wing covering department where the fabric is put on. They are then moved into the dope room which is behind the parts department, for treatment. From the dope room they are moved to the rigging room where the fuselages from the other building are waiting.

In case the planes are to be shipped by railroad to their destinations, it is not necessary to rig them at the plant. The fuselage is moved directly from the final assembly room in the first factory, and the wings from the second factory to the railroad station. They do not meet until the box car is reached in which they are shipped.

Needless to say, the factory is equipped with the latest type of machinery, ventilating systems and fire prevention apparatus. It was erected less than a year ago and was designed as an airplane factory. The doors opening on the court between the two buildings are the full width of the structure. The use of the islands is an outstanding feature of the factory. They permit the dropping down of the sub-assemblies into the production line with-

(*Continued on page* 498)



The plant of the Travel Air Manufacturing Co. at Wichita, Kan.

The Lincoln-Page

New Three Place, Open Cockpit Biplane is Designed to be Powered With an OX-5 or Wright-Hispano Engines

THE Lincoln Aircraft Co., of Lincoln, Neb., is now in production on a new three place biplane designed for the 90 hp. OX-5, or 150 or 180 hp. Wright Hispano engines. Either of these power plants may be installed by merely changing the engine mounting and cowling, the remainder of the plane being standardized in construction for all installations.

The Lincoln-Page biplane, powered with a 180 hp. Wright Hispano engine, has a maximum speed of 130 m.p.h and a cruising speed of 110 m.p.h. The landing speeed is 48 m. p. h. The plane climbs at the rate of 1,000 ft. per minute and the service ceiling is 16,000 ft. A total gasoline capacity of 67 gals. gives the plane a cruising range of 600 mi. at maximum speed and 715 mi. at cruising speed.

A Welded Steel Fuselage

As in a high percentage of new production planes, the Lincoln-Page has a welded steel tube fuselage and tail group and wood wings, covered with fabric. The fuselage is of conventional design being built in the form of a truss and having reinforcements at all important points in the welding. The tail group is of similar construction. Elevators are built in a unit requiring only one horn which is inside the fuselage. All metal is given a coat of Linoil to prevent corrosion before being covered.

Four bolts are used to attach the engine mounting to the fuselage and all of the tubes that comprise the mounting are reinforced by telescoping a heavy gauge tube inside the main members. The engine is supportd on ash bearers. A terne plate fire wall insulates the engine from the rest of the fuselage, decreasing the fire hazard. Bolted directly to the fire wall and above the engine is a water expansion tank which provides for any possible overheating. The radiator, however, being mounted in the slipstream below the fuselage, affords ample cooling under any operating conditions. For cold weather operation a set of radiator shutters is provided and operated by a lever in the pilot's cockpit. An oil cooling tank is placed directly below the engine inside the cowling, which has louvres in both front and rear, the forward louvres being reversed to admit cold air from the slipstream.

Solid Spruce Spars

No radical departures from new production practice are found in the construction of the wings. The spars are of spruce and are solid throughout their length, affording ample strength for the wing structure. The former ribs are of basswood with cap strips at the top and bottom and lightening holes to decrease their weight. Compression ribs are of solid spruce. The leading edges have extra nose pieces to prevent the covering drawing in excessively between nose ribs. Solid hard aircraft wire is used in the drag bracing. Ailerons are double and are similar in construction to the wings, having spruce spars and basswood ribs. Interplane and center section steel tube struts and streamline steel tie rods provide the external wing bracing.

(*Continued on page* 496)

A side view of the Lincoln-Page three place open cockpit biplane powered with a 90hp. OX-5 engine manufactured by the Lincoln-Page Aircraft Co. of Lincoln, Neb.

Production Planning *and* Control

BY EDWIN R. DOUGLAS
Consulting Engineer

PRODUCTION must be controlled through exact knowledge of what is to be done, how it is to be done, by whom it is to be done, and when it is to be done. The first two (What and How) will be embodied in:

(1) Drawings of the parts and assemblies.
(2) Definite Specifications of the material, labor, machines, and tools required.
(3) Stores, Records and Methods that ensure having necessary material on hand when wanted.
(4) Written instructions (where required) telling how the operations are to be done.

The second two (By Whom and When) are covered by:

(1) Scheduling all production orders for parts and assemblies as to the machines or work-places where the work is to be done, and the priority, or sequence in which they are to be run.

(2) Dispatching these orders, at the proper times, to the designated machines or work-places where the work is to be done, and the priority, or sequence in which they are to be run.

(2) Dispatching these orders, at the proper times, to the designated machines or work-places, with all materials and tools required for carrying on the work.

(3) Constant Check-Up of work in process to see that things are going as scheduled, to prevent interferences, and to take care of emergencies.

Through experience, certain methods have been worked out as best for carrying on these different functions. These will now be discussed and compared.

Drawings

The making of these by the Drafting Room comes under the supervision of the Chief Engineer and will of course be done according to his instructions. There are, however, a number of ways in which the work of production may be helped by a well-planned arrangement

(*Continued on page* 490)

DRAWING AND PART-NUMBERS — TYPE C 2 — GROUP W — WING — N. E. A. Co. Form D-2

Part No. Type	Group	No.	Supersedes No.	Superseded by No.	NAME	Drawn by	DATE
B C2	W	1			Upper Wing Dowels	ACE	1/2/27
A C2	W	2			Wing Fitting, Upper Right Front	EMG	1/17/27
A C2	W	3			" " " Left "	"	"
A C2	W	4		A C2 W 10	" " " Right Rear	"	"
A C2	W	5		A C2 W 11	" " " Left Rear	"	"
A C2	W	6			Interplane Strut Attachment Lug, Front	ACE	1/18/27
A C2	W	7			" " " " Rear	"	"
A C2	W	8			Wing-Hinge Reinforcement, Front Spar	ACR	2/14/27
A C2	W	9			" " " Rear "	"	2/16/27
A C2	W	10	A C2 W4		Wing Fitting, Upper Righ Rear	"	3/1/27
A C2	W	11	A C2 W 5		" " " Left "	"	3/1/27
D C2	W	12			Aileron Assembly	ACE	3/6/27
- C2	W	13			Aileron-Control Bearing Fitg (see Drawing A C2 W 14)	"	3/8/27
A C2	W	14			Aileron Control-Tube Bearing (also C2 W 13)	"	"
- C2	W	15			Plywood 1/16" x 48" x 72" for Diagonal Gussets	EMG	3/14/27
- C2	W	16			" 1/8" x 12" x 82" for False Spar	"	"
- C2	W	17			Wing Center Section Complete	ACE	3/18/27

BLUEPRINT RECORD

P1 1/3/27				
P2 1/19	P3 1/19			
"	"			
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P2 1/21	P3 1/21			
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P2 3/15	P3 3/15	E5 3/14		
" 3/17	" 3/19	E5 3/18		
P2 3/3	P3 3/6	E5 3/14		
"	"	"		
P8 4/29				
P2 3/9	P3 3/9	T5 3/11	E5 3/19	

Reproduction of a filled in sheet of a drawing and part number record book.

The Merits of Aviation Natural Gasoline

By "Billy" Parker
Test Pilot, Phillips Petroleum Co.

FOR some years past the need has existed for a more volatile fuel than domestic aviation gasoline. This need has been felt more keenly during the last two or three years since the later types of high compression engines, and especially the radial, air cooled engines, which admittedly present more or less of a problem as regards even fuel distribution and operating temperature control, have come into general use.

Aircraft operators who use these later engines, and particularly those whose routes are of such a nature as to require flying at extremely low atmospheric temperatures, have experienced considerable trouble in securing a fuel which will operate satisfactorily, due primarily of course, to the fact that the heavier material in the gasoline which has been available will not vaporize.

These heavy ends which enter the engine in the form of liquid are not readily combustible and consequently not only fail to deliver power, but cut lubrication, foul spark plugs and otherwise adversely affect the general performance of the engine—under some conditions to such an extent that it is impossible to maintain flight even at wide open throttle.

"Hot-Spot" a Common Remedy

Many operators have attempted to overcome this difficulty in various ways. The most common means of obtaining better engine operation has been to supply an additional amount of heat to the carburetor air intake, or to install a "hot-spot" between the carburetor and the fuel intake manifold.

These added features are both very desirable with any gasoline if the amount of heat applied is not excessive. It is not desirable that an amount of heat greater than the latent heat of vaporization of the fuel used be applied to the carburetor air intake, although this amount at the air intake is not only desirable but necessary in order that the air passing the jets in the carburetor will not have its moisture content condensed and frozen, thereby closing the opening in the jet itself as well as the fuel passage in the carburetor.

It should be realized that when the air passes the jets in the carburetor and on through the throttle butterfly valve, there is a drop in temperature due to the latent heat of vaporization of the fuel which is being vaporized. This temperature drop varies from 10 deg. to 60 deg. F., depending upon the conditions under which the gasoline is being used. Naturally the moisture in the air will freeze if operating conditions are such that there is a sufficient drop in temperature.

An exhaust stove or other suitable means of supplying heat to the air intake, provided with an adjustment in order that the proper amount of heat may be applied, should be employed, and practically all engine builders now equip their engines with such devices.

Many tests have shown that even extremely low atmospheric temperatures will not cause a frosting in the carburetor unless there is a high moisture content in the air. On the other hand—frosting conditions have been encountered in fairly warm weather if a considerable moisture content is present in the air. From this it will be seen that the air temperature is really no index as to the amount of heat necessary to counteract the frosting condition, but since a loss of power will be noticed as the ice builds up in the carburetor, the pilot has ample time to apply heat to the air intake before the condition becomes serious.

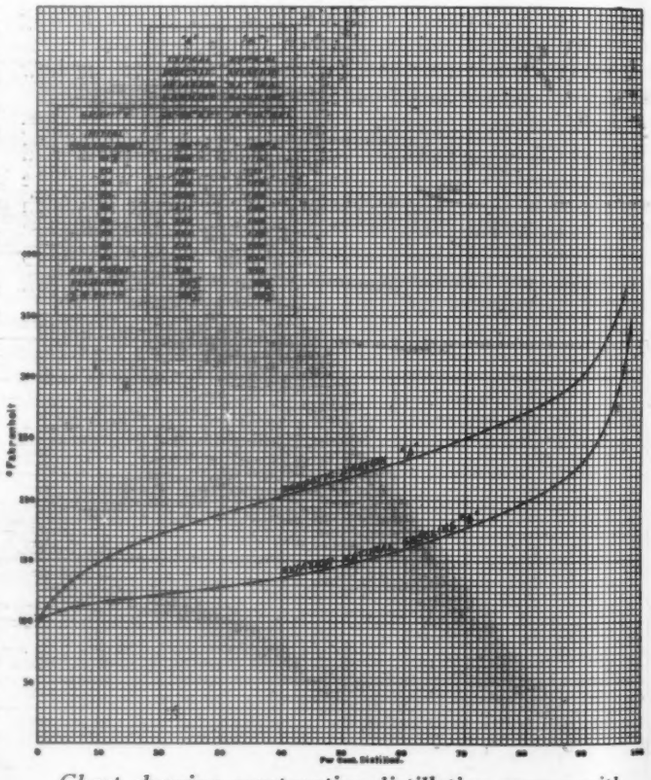


Chart showing comparative distillation curves with other normal aviation gasolines.

In using the new aviation natural gasolines which are now available, the hot spot above the carburetor is not necessary because this gasoline is very volatile and con-

(*Continued on page* 489)

The Elias "Aircoupe"

A Two Place Anzani Powered Biplane Easily Converted from the Open Cockpit to the Closed Cabin Type

TESTS were made recently by G. Elias & Bro., of Buffalo, N. Y., on its new convertable monoplane. The Company plans to go into production on that model at an early date. The plane is known as the Elias "Aircoupe" and designated Model E.C.-1. It is a two place, externally braced, high wing type, powered with an 80 hp. Anzani radial aircooled engine. The convertable feature makes it possible to change the plane from an open cockpit to a closed cabin type in a very short time without altering any part of the structure of the plane.

One of the most noteworthy features of this plane is its simplicity of design. Wherever possible, right and left hand parts are made to be interchangeable. This is true of the ailerons, elevators and practically all of the fittings throughout the entire plane. This reduces spare parts investment to a minimum.

The plane has a wing span of 28 ft. 1½ in.; an overall length of 20 ft. 11 in. and a height of 7 ft. 2 in. It weighs 870 lb. empty and carries a useful load of 518 lb. It has a maximum speed at sea level of 90 m.p.h. and a climbing rate at sea level of 590 ft. per min. The landing speed is 30 m.p.h. and the service ceiling 10,000 ft. The plane was designed by Joseph L. Cato.

In fuselage construction the aircoupe conforms with new production practice, using welded chrome molybdenum steel tubing of extra diameter and thickness throughout. No bracing wires are used in the fuselage. The finished structure is rust proofed and covered with a high grade of fabric. The engine mounting is also of steel tubing and is designed so that all parts of the engine are easily accessable. The power plant may be dismounted by the removal of six bolts. An efficient firewall is provided between the engine and seating compartment. The cowling is so designed that by removing a few keys it can easily be detached from the fuselage.

The wing cellule is of the monoplane semi-cantilever type. The lift truss consists of two struts between each wing panel and the fuselage. These struts are directly attached to tie rods running through the fuselage inside of a heavy guage steel tube which also acts as a compression member. This eliminates the possibility of fitting failure at the fuselage through crystalization due to vibration.

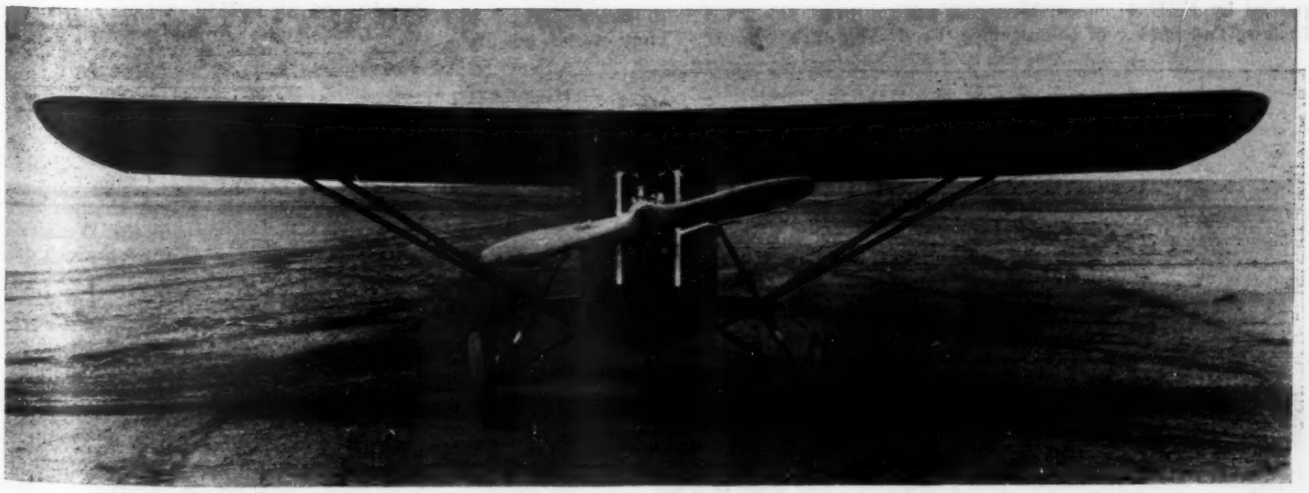
The upper ends of the struts are fastened with universal fittings cut from solid nickel steel forgings, heat treated, which bear on aluminum pads on the under sides of the spars. This allows the inverted load to be taken on the under side of the spar rather than on the bolts that hold the side plates carrying the lift loads. By the arrangement of the lift struts and the location of the aileron all possibility of aileron loads causing warping of wing is eliminated.

Wings Constructed of Wood

The wings are constructed of wood with solid spruce spars and rib webbing is of plywood with spruce cap strips. Leading and trailing edges are of heat treated duralumin. The spars are connected together at their inner ends with two ⅝ in. heat treated nickel steel "T" bolts Tie rods are used in the internal wing bracing. Large diameter bolts are used to provide proper bearing surface for the cabane struts which terminate together at the center of each spar between the wing panels. The wings are covered with fabric and doped.

Landing gear is of the split type with shock absorber struts between the axles and upper fuselage longerons. The compression load is taken by steel coil springs and bouncing is prevented by hydraulic cylinders. The tread of the wheels is 7 ft. 3 in. The tail skid swivels on the

(*Continued on page* 488)



Front view of the Elias "Aircoupe" powered with an 80 hp. Anzani engine.

Three Westward Attempts To Fly the Atlantic Fail

Franco, Courtney, Kubala and Idzikowski Meet Reverses, But No Lives Are Lost

NEW YORK, N. Y.—Within the space of a week three attempts to cross the Atlantic by plane from East to West have failed. Maj. Ramon Franco, Spanish flier, and three companions, left Cadiz, Spain, in a Dornier Superwal flying boat on the morning of August 1 bent on circling the globe in 45 days. They were forced down, however, off the south coast of Portugal less than 100 mi. from their starting point.

Late the same day, Capt. Frank T. Courtney, British flier, and his three companions, took off from Horta in the Azores in the Napier powered Dornier plane "Whale" to fly 1,800 mi. to Newfoundland. Trouble with the fuel feed line and a resulting fire brought the Whale down early the next day. A steamer picked the fliers up some 18 hr. later.

Feed Line Trouble

The third venture of the week was that of the Polish fliers Maj. Kasimir Kubala and Maj. Louis Idzikowski. These airmen took off from Le Bourget airport, Paris, in the French Amiot sesquiplane "Marszalek Pilsudski" on the morning of August 3 to fly directly to New York. Gaining the vicinity of the Azores, trouble with the feed line brought them to turn back toward Europe and subsequent engine trouble resulted next day in the fall of the plane into the sea some 60 mi. off Cape Finisterre, Spain. The German ship Samos picked them up and brought them into Leixoes, outer port of Oporta, Portugal.

Captain Courtney, who has been balked for more than a year in trans-Atlantic attempts, finally obtained a new twin-engined Dornier Wal plane. On June 13 he left Pisa, Italy, and flew to Lisbon, Portugal, where he was held up until June 28. On the latter day he flew to the Azores only to be held up by weather and repairs until the present flight. Captain Courtney was accompanied by E. B. Hosmer, Montreal millionaire and backer of the attempt, Fred Pierce, mechanic, and E. W. Gilmore, radio operator.

After leaving the Azores in the flight to Newfoundland everything went well until early in the morning when a break in the feed line brought a spray of gasoline over the rear Napier engine. A fire ensued. Courtney immediately put the flying boat into a dive, and Pierce stopped the flow of the gasoline and worked with the fire extinguisher. A safe landing was made, but with the fire extinguisher exhausted the fliers were forced to let the remaining flames burn themselves out during a dangerous 15 min. period in which the main 600 gal. fuel supply was menaced.

Landed Northeast of Azores

The flying boat had come down at a point approximately 750 mi. southeast of Cape Race and some 600 mi. northeast of the Azores. The metal construction of the plane had enabled it to withstand the ravages of the fire.

With the fire out, Gilmour began sending for help with the radio set. A number of steamers began a search, and after a drift of 18½ hr., the airmen were picked up by the Minnewaska, which was sailing to New York. The Dornier had to be abandoned.

The Polish fliers, on the other hand, carried no radio but were reported by three ships prior to being picked up by the Samos. They were at first sighted 60 mi. at sea by the French trawler Pingouin headed westward, next they were reported by the tanker Aztec in a position a few hundred miles north of the Azores, and finally they were seen flying in a northwest direction and headed back toward Europe, this time by the Amakura, which lay east of the Aztec. Major Kubala and Major Idzikowski were then thought to be lost since no further word was received for some hours, but next day the Samos brought the fliers to the Portugal port, and it was learned how they had been picked from the sea following the smash of their Amiot plane as it encountered the water.

The Marszalek Pilsudski was an Amiot sesquiplane with a span of 69 ft. 10 in. on the high wing, a length of about half that measure, and a height of 15 ft. The plane was powered with a single Lorraine-Dietrich 650 h.p. water cooled engine. The maximum speed of the craft was said to approach 130 m.p.h., and the ceiling was put at 15,000 ft. Loaded the Amiot weighed 7,920 lb.

Captain Courtney's Dornier Wal flying boat. The craft is powered by two Napier engines in tandem.

California Plans To Tax Aircraft

LOS ANGELES, CALIF.—That aircraft may be heavily taxed in some states unless steps are taken to combat present legislative tendencies is indicated by the announcement that the California State Division of Motor Vehicles is considering some way of taxing manufacturers, commercial aircraft operators, and airplane owners.

State Attorney General Webb has ruled that the Federal Air Commerce Act of 1926 does not dispense with the necessity for State Regulation and State Taxation.

It is said that at present airplanes in the State of California are taxed as personal property but that few assessors have been listing them and that no tax has been placed on the receipts of operating companies.

S. A. E. Meeting Notice

NEW YORK, N. Y.—A change has been made in the date of the Western Aeronautic Meeting of the Society of Automotive Engineers which is to be held at the Biltmore Hotel in Los Angeles. Instead of September 13-14, as previously announced in Meeting Progress Bulletin No. 33, the meeting will be held September 11-12.

The Eastern Aeronautic Meeting of the S. A. E. will be held December 6-7 in Chicago and the Aeronautic Operation Meeting is scheduled for January, 1929, in this city.

College to Give Air Law Course

German Authority to Lecture at University of Southern California

LOS ANGELES, CALIF.—Dr. Otto H. Schreiber, head of the Institute of Air Law at the University of Koenigsberg, Germany, will give a lecture course in Air Law during the second half of the summer session of the School of Law of the University of Southern California as a result of a special lectureship established by the Union Oil Co., according to announcement of President R. B. von Klein Smir.

Dr. Schreiber will lecture four evenings a week for three weeks at the law school, beginning August 13th, and also will head a series of six morning lectures in the Institute of Public Administration, August 13-18 inclusive, at the University of Southern California.

Representing the legal and educational professions, a committee responsible for the opportunity afforded by the Air Law Lectureship and instrumental in bringing Dr. Schreiber to southern California includes Col. W. Jefferson Davis, San Diego attorney; Gurney E. Newlin, a director of the Union Oil Co.; Dean Justin Miller of the Law School of the University of Southern California; Dean Reid L. McClung of the College of Commerce at Southern California; Emery E. Olson, Director of Coordination, University of Southern California; and Professor Earl W. Hill, faculty member of the Commerce College.

Professor Fagg to Koenigsberg

Prof. Fred D. Fagg of the University of Southern California has been appointed exchange professor to the University of Koenigsberg, Germany, where he is to be associated with the Institute of Air Law headed by Dr. Otto H. Schreiber. Dr. Rudolf Hirschberg of the Air Institute is to be at the University of Southern Cailfornia during the year Dr. Fagg is in Europe.

The Fellowship for Foreign Research in Air Law has been established by a group of San Diego citizens interested in the advancement of aviation, including Col. Thomas D. Davis of the San Diego Army and Navy Academy; Col. W. Jefferson Davis, attorney; Miss Ellen Scripps; George W. Marston; Arthur Marston; W. E. Kier; Bernard Levi; Samuel I. Fox; E. B. Gould, Jr.; Roscoe E. Hazard; G. A. Davidson; F. M. White; Frank Sierert; Paul J. Healy; Frank Lynch; and Tom Scripps.

Unique Air Law Library

Dr. Fagg is the first American university staff member to go to Europe to study air law, according to Dr. Reid L. McClung. Dr. Schreiber has a unique library of about 400 volumes on air transportation and law, and is codifying the air laws of numerous countries. Professor Fagg is to divide his time between research work and teaching in the Institue of Air Law. He has had two years actual flying experience, having served as pilot in the 92nd Aero Squadron during the war.

Film to Explain Plane Operation

NEW YORK, N. Y.—Within the next few weeks, the average man will be enabled to go to the movies and learn about the operation of an airplane. The Fox News, it is announced, has just completed a standard reel of pictures taken at the Farmingdale, L. I., plant of the Fairchild Aviation Corp. in which is demonstrated actual use of the controls for a take-off, landing, and banking, as well as some of the various operations indulged in by stunt pilots.

Boeing Company Plans Production Increase

SEATTLE, WASH.—The Boeing Airplane plant here will put into effect within 30 or 60 days a building expansion program that will increase the capacity of the big factory approximately 30 per cent. The final development contemplated may run into several hundred thousand dollars. Several new types of planes will be added to its present program of production.

A number of big contracts are now near consummation in the factory. One is for the 16 huge tri-motored eight-passenger transport planes, of which the first now is being tested at Boeing Field, Seattle's new municipal airport. It is reported that the plant will continue production of the new 89's, the single-seater fighting plane sent East this week for inspection by Navy and Army officials at Washington, D. C.

Not Smith's Picture

Under the caption "Joins Byrd," a picture alleged to be that of Dean C. Smith was published in the August 4 issue of AVIATION. That Smith, a veteran mail pilot on the New York-Cleveland route, had joined the Byrd expedition was correct, but the picture was not that of Smith and was used through error.

General Monoplane Tested

BUFFALO, N. Y.—A new monoplane, the first turned out by the General Airplane Corp. in its new Buffalo plant, is being tested here. The plane is an open two-place craft with a 110 hp. Warner engine. Tests are being made by F. McLean Gardner, general manager of the plant and war ace.

Reviews

The Book Department, Aviation, 250 West 57th St., New York City, can supply all books mentioned except government publications. N.A.C.A. publications may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

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Airmen or Noahs. By Rear Admiral M. F. Sueter, R. N. The war-time director of the Aviation Department of the British Admiralty has written a book which should be read by all those interested in both sides of the aviation question. Perhaps he is slightly more conservative in his views than some over-zealous students, but he sets forth his argument and backs it up with proof obtained while he was so closely connected with the flying service of the British navy. If he does not agree that armies and navies can be abolished he does believe that aviation can help both these series to attain a greater efficiency.

Undoubtedly his chapters on civil aviation are the most valuable contribution. He deals with the opening of new fields in the dominions by the use of aviation and offers us many suggestions for making our distant parts more accessible and thus more capable of productivity. "High-speed air travel and air transport throughout the Empire should be our great aim," he writes.

His discussion of the commercial routes and possibilities for additional routes—from a British standpoint—is well worth reading. It is in reading such accounts of the advance in aviation in its short existence that we are compelled to foresee a future of ever-expanding usefulness and profit. As he says, "None but a faint-hearted fool would block air progress."

His chapter XIII on the value of long distance flights gives a complete resume of the successful flights. He, naturally, is strongly in favor of such tests and outlines the value of them to aviation progress.

Some interesting data is provided in his chapter on the Schneider Cup Races which deals principally with the 1927 race won by Great Britain—through the backwardness of America.

In treating of the commercial future of aviation especially in regard to England's requirements, the author advises that constructors should "go full out for building flying *ships, not boats.*" He seems to foresee a great future for this type of plane.

Publications Received

National Advisory Committee for Aeronautics List of Reports with prices. June 1, 1928, edition.

National Advisory Committee for Aeronautics Technical Memorandum No. 472. Experiments with a Wing from which the Boundary Layer is Removed by Pressure or Suction, by K. Wieland. From Zeitschrift fur Flugtechnik und Motorluftschiffahrt, Aug. 16, 1927.

National Advisory Committee for Aeronautics Aircraft Circular No. 77. Rene Couzinet Monoplane (French). From Les Ailes, March 29, 1928.

Aquatite Exceeds U.S. Requirements

New Waterproof Plywood Also Used by Private Aircraft Manufacturers

LOUISVILLE, KY.—The Research Department of the Crescent Panel Co., Louisville, Ky., after an extended series of experiments, announced the successful development of an absolutely waterproof plywood from casein for use in airplane and marine manufacture. This product has been placed on the market under the trade name "Aquatite." At the present time it is being used extensively by the United States Government in the manufacture of Army and Navy aircraft, as well as by numerous other airplane manufacturers.

The first order supplied the Navy was manufactured under specifications calling for a dry test of 300 lb. per sq. in. and a wet test demanding 180 lb. per sq. in. after 48 hr. soaking in cold water. Tests on this lot exceeded all requirements.

The results of tests by the Army and Navy and the Forrest Products Laboratory at Madison, Wis., follow:

	No. 1	No. 2	No. 3
	(lb. per sq. in.)		
3/64th Birch	...	...	332
1/16th Birch	...	...	290
1/32nd Birch	...	...	290
1/8th Birch	...	...	206
3/16th Birch	...	...	196
1/4th Birch	...	...	254
1/16th Mahogany ...	230	257	214
3/32nd Mahogany ...	...	274	276
1/8th Mahogany	...	239	148
3/16th Mahogany ...	...	195	246
1/4th Mahogany	...	248	260

No. 1, Test by War Department, May 10th, 1928.

No. 2, Test by Navy Inspection Department, May 1st, 1928.

No. 3, Test by T. R. Trua of Forest Products Laboratory, April 21, 1928.

Crescent Firm Represents Group

The Crescent Panel Co. is a component of the plywood factories under one management, which includes besides the above, the Hoosier Panel Co. and the Indiana Veneer and Panel Co., located in New Albany, Ind. The latter factory is one of the pioneer plywood factories of the country, having been founded in 1903. Thus, "Aquatite" has 25 years of successful plywood manufacturing behind it, thereby assuring a thorough knowledge of fundamentals.

The Crescent Panel Co. is located in the west end of Louisville on the Kentucky and Indiana Terminal Railroad. It is situated close to the geographical center of the country, making for quick service and low freight rates. It is in the very heart of the veneer producing industries and raw materials are easily available on short notice. It is housed in a modern one floor brick factory, equipped with the most up-to-date machinery and manned by a veteran corps of skilled workmen. All work is given the closest supervision and is subjected to the most rigid inpection and testing.

Aircraft Export Shows Increase

WASHINGTON, D. C.—According to the 1928 Year Book of the Department of Commerce made public recently, the total value of aircraft engines and parts, except tires, exported in 1927 was $1,904,000, an increase of 85% over 1928. Exports of parts, except engines and tires, reached a value of more than five and a half times as large as that in 1925. Shipments of aircraft have shown a somewhat less rapid increase, but were over twice as high in value in 1927 as in 1924. The large increase in export sales of aircraft engines which occurred in 1926 was followed by a recesion in 1927.

Eight countries took nearly four-fifths of this trade during 1927. With few exceptions, the leading destinations of airplane exports in 1927 were the same as in the two preceding years. The chief markets in 1927 were Canada, Peru, Chile, and Soviet Russia.

Missouri River Survey Bids Being Accepted

KANSAS CITY, MO.—Sealed bids in duplicate will be received at the U. S. Engineer Office until 12 o'clock noon, Aug. 17, 1928, and then publicly opened, for furnishing all labor and materials and performing all work for an aerial survey of the Missouri River and tributaries, covering about 810 mi. of the Missouri River from the mouth to the Big Sioux River, and the lower 10 mi. of the following tributaries: Big Blue River, Kansas River, Big Platte River, and Big Sioux River. Further information will be given on application to Maj. G. R. Young, District Engineer, Room 707, Postal Telegraph Bldg., Kansas City, Mo.

Named Aero Oil Dealer

ORLANDO, FLA.—Nilson-Mueller, Inc., Florida Waco Distributor, announces the company's appointment as state distributor of "TP" aviation oils produced by the Texas Pacific Oil Co. Associate dealer contracts have been assigned to six Florida Waco agents.

Steele Paves Way For Derby Fliers

Seeks Cooperation of U. S. and Canadian Cities in Staging Event

LOS ANGELES, CALIF.—Dudley M. Steele, contest chairman for the National Air Races to be held here September 8-16 inclusive, recently made a trial flight of the route to be followed by contestants in the international air derby from Windsor, Canada to this city. The event is one of the eight major contests to terminate here during the nine day meet.

Steele's purpose in making the flight was to seek full cooperation of the Dominion of Canada in the event which is to be limited to Canadian pilots and to enlist the support of the municipal governments of the control cities along the route. On his flight to the Canadian city Steele visited each of the control cities including Las Vegas, Nev.; Milford and Salt Lake, Utah; Rock Springs and Cheyenne, Wyo.; North Platte, Neb.; Omaha and Iowa City, Ia.; Chicago, Ill.

Only recently Steele returned to this city from a similar trip over the route to be flown by contestants in the three controlled air derbies from New York City, to terminate here in September. The success of his flight over this course, on which he visited and enlisted the co-operation and support of the seventeen control cities, brought about the decision of the executive committee to dispatch Steele on the flight through the Canadian derby controls.

The international derby has attracted tremendous interest, according to Steele, who reports that his contest committee already has received requests for more than 150 entry blanks. Upon his return he will compile a complete air log of the course, with which each of the entrants in the Canadian derby will be furnished. This log will report gasoline consumption, time in the air, conditions encountered and other important data.

Supreme Propellers Prove to Be Efficient

WICHITA, KAN.—After viewing tests of three Supreme propellers, the latest aeronautical device to be made in Wichita, airmen declared themselves favorably impressed with the efficiency demonstrated. Flights in a Travel Air OX-5 biplane, equipped with a Supreme propeller, were made by Clarence Clark, chief test pilot for Travel Air, Inc.

Three propellers were used. They are of mahogany construction, eight ft. six in. in length and the tip of each blade is of metal. The Supreme propeller is the patent of M. J. Stone. The propeller already has been placed on the market at Dayton and St. Louis.

Bliss Co. Gets Bristol Manufacturing Rights

NEW YORK, N. Y.—The E. W. Bliss Co., heavy machinery manufacturers of 53rd St. and 2nd Ave., Brooklyn, has obtained rights to manufacture and distribute the Bristol Jupiter radial air cooled engine. The Bliss company recently closed negotiations with the Bristol Airplane Co., Ltd., of Bristol, England, and is awaiting the arrival of model engines. Representatives of the American firm have been studying Bristol production methods and assembly operations and a large production is planned here in the immediate future.

The Bristol Airplane Co., which is a pioneer in the development of the static radial air cooled engine, has incorporated a number of distinguishing features in this power plant, which has been in use for some time by the principal foreign air lines, including the Imperial Airways, Royal Dutch Air Lines, Deutsche Luft Hansa, Farman Air Lines, Transadriatica, and others. It is a light-weight 9-cylinder engine developing 477 hp. at 1700 r.m.p., and 520 hp. at 1870 r.m.p. The essential features of this engine, its ability to develop greater speed and carry a bigger payload, have caused it to be widely adopted throughout Europe and the continent fo rcommercial air transportation

Sperl Aero Corp. Buys 36 Lockheed Airplanes

LOS ANGELES, CALIF.—Thirty-six Lockheed airplanes have been ordered by the Harry Sperl Aero Corp., newly appointed Lockheed distributors for the States of California, Oregon, Arizona, and New Mexico. Involving the sale of more than $500,000 worth of commercial aircraft, this is said to be the largest order for such equpiment ever to be placed in Los Angeles.

Harry Sperl is also Western Distributor for the Curtiss "Robin" and is the Los Angeles dealer for Gardner automobiles. A complete sales organization is now being perfected in order to handle the merchandising of airplanes in quantity lots.

Twelve of the Lockheed planes are to be delivered equipped with the 410 h.p. Wasp engine, the remainder to be powered with the standard Wright Whirlwinds. Although the Lockheed factory has repeatedly doubled and redoubled production it is now many months behind orders.

Orders Supreme Propellers

WICHITA, KAN.—An order for 15 mahogany propellers a week has been placed with the new Supreme Propeller Co. of Wichita by the Travel Air Manufacturing Co. The new air screw has recently been successfully tested in Travel Air planes. The company is considering going into production later on a metal propeller.

Story Firm Buys New Equipment

LOS ANGELES, CALIF.—Thousands of dollars' worth of new equipment has been installed in the C. S. Story propeller works at 1540 N. San Fernando Road, Glendale. A new automatic lathe, new glue room, stock room, sanders, buffers and other machinery will give this plant a capacity of approximately 25 wooden propellers daily when quantity production is reached. At the present time 90 per cent. of all Story propellers are being shipped east of the Rocky Mountains, and Charles Story, firm in the belief that the wooden propeller is here to stay, is making a bid for national distribution of his product. The Story organization has also taken the western distributorship for Micarta propellers.

Load Tests Conducted On Ribs for Monoplane

SYRACUSE, N. Y.—Stress static tests on the wing ribs to be used in the "Homer" monoplane, now being built by the Hogan-Moyer Aircraft Corp. of Syracuse, N. Y., were conducted recently and show high safety factors for both compression and former ribs.

The compression rib, which weighs 9 oz., complete chord was tested under a load of 1400 lb. without yielding. The former rib which weighs less than 6 oz. was placed under loads up to 791 lb. without yielding. The factor of safety of the compression rib is 22 and that of the former rib 21.

The Homer monoplane is an externally braced high wing cabin design and will be produced in two models one of which will be known as the coupe and the other the coach. The coupe is a two to three place type, powered with an Anzani engine. It has a wing span of 30 ft., an overall length of 20 ft. and a height of 6 ft. 6 in. The weight empty is 400 lbs., the disposable load 380 lbs., and the fuel capacity 10 gal.

The coach model is a four to six place type powered with an OX-5 engine and having a wing span of 41 ft., a length of 26 ft. 9 in., and a height of 7 ft. 6 in. Its weight empty is 1,200 lbs., its disposable load 820 lbs., and its fuel capacity 32 gal.

New Instruments for Navy

NEW YORK, N. Y.—The Consolidated Instrument Co. of America, Inc., has recently been awarded an experimental contract by the Bureau of Aeronautics of the Navy Department. The contract calls for the development of a new type of tachometer with a 2¾-in. dial. A new altimeter will also be developed along similar lines.

Expedite Issuing Student Permits

New System Allows Physicians to Grant Temporary Right to Fly

WASHINGTON, D. C.—A new system is being established by the Aeronautics Branch, Department of Commerce, to facilitate the issuing of student aviator permits. This will, in many cases, eliminate a delay of one month, which has heretofore existed.

It is quite possible under this plan for a prospective student to decide to take a flying course in the morning, interview the school, make out his applicatin; and take his physical examination; and begin actual flying instruction the same day. This will greatly assist both the school and the student and there will be no more delay for students wishing to take flight instruction.

Need Not Send to Washington

According to the new method the student should make out his application for student's permit in duplicate, one copy being sworn to, and attach thereto two photographs of himself, head and shoulders only. He may take this application to the authorized examining physician who will check it for correctness and accept it. The student no longer is required to send the application to Washington. If the student successfully passes the medical examination the physician will issue the student a Letter of Authority, allowing him to operate pending the receipt of the actual permit.

Large Floats Increase Fairchild FC-2 Payload

NEW YORK, N. Y.—The current engine pontoon installation developed by the Metalboat division of the Fairchild Airplane Manufacturing Corp. of New York for use with the Whirlwind powered FC-2 monoplane, consists of a pair of floats of 4400-lb. displacement each, or 8800 lb. total. The overall dimensions are 21 ft. 2 in. by 33 in. by 30 in.

These pontoons are of large flotation and afford the maximum degree of seaworthiness. The extra planing service and reserve buoyancy of the installation permit several hundred pounds more payload being taken off than would ordinarily be the case. In addition to the main strut bulkheads, three extra water-tight bulkheads are fitted in each float, giving a total of twelve water-tight compartments in the complete installation as against six in previous models. Extra hand-holes have also been included, thereby providing a minimum of two in each compartment. This is said to afford ample opportunity for thorough ventilation and quick inspection of the interior.

AIRPORTS AND AIRLINES

New Rate Brings Increase in Mail

C. A. M. Lines Report Large Traffic as Five Cent Scale is Inaugurated

Though it is too early to give statistics showing the full effect of the new air mail rate on the traffic in various parts of the country, reports have been received which indicate the trend of increase observed with the inauguration of the new five cent scale. Throughout the nation the air mail planes established a record for volume carried and miles flown, the American Air Transport Association announces. The following news items indicate the activity during the first few days.

HARTFORD, CONN.—With the beginning of the new postal rates for air mail, a flood of mail was on hand at Hartford post office. The planes use Brainard Field as their landing place and the Colonial Air Transport Company has the contract for the mail delivery.

Over 3,000 air mail stamps were sold and a huge cargo left the field. The Colonial Air Transport, Inc., states that the air mail load leaving Hartford on the first day was four times greater than usual.

NEW YORK, N. Y.—An extremely heavy poundage of air mail is reported here by the National Air Transport Co. for the first day's traffic under the new air mail rates. The increase for August 1 was put in the neighborhood of 100 per cent., while a 40 per cent. increase was reported for the two following days. As for the transcontinental route in general, a 40 per cent. increase was noted throughout according to early estimations.

LOS ANGELES, CALIF.—On the evening before the new rate went into effect, sale of new air mail stamps passed the 500,000 mark here. A large increase in poundage was then reported under the new rates by the Western Air Express, Inc., operating the air mail route between Los Angeles and Salt Lake. It is estimated that the new postage scale will save Los Angeles mail users approximately $300,-

ST. LOUIS, Mo.—To meet the increase in air mail brought about by the new five cent rate, the Robertson Aircraft Corp., operating the St. Louis-Chicago route, arranged its planes to haul the capacity loads. The new Whirlwind powered Travel Air was brought in by Chief Pilot Gurney from Wichita where the mail pit had been enlarged and the front cockpit arranged as an auxiliary mail compartment.

BUFFALO, N. Y.—Two thousand air mail letters were shipped over the Buffalo-Cleveland route on the first day that the reduced air mail postage went into effect. Fifty-six pounds of air mail were carried, which is 30 above the average. For the month of July an average of 22 lbs. a day had been shipped over this route.

OMAHA, NEB.—Air mail through and in and out of Omaha doubled in volume during the 24 hours following the reduction of the postage to five cents for the first ounce, H. W. Peterson of the traffic department of the Boeing Air Transport Company, said. Letters mailed in Lincoln exactly doubled in volume.

MILWAUKEE, WIS.—A record volume of air mail left here Wednesday, August 1, the first day of the new air mail rate of five cents for the first ounce. The load taken to Chicago was 126 lb. 14 oz.—a poundage only surpassed during the Lindbergh and Bremen demonstrations.

Capital Air Lines In Feeder Service

OAKLAND, CALIF.—A tri-weekly airplane passenger service is now being operated between Oakland and Sacramento by the Capital Air Lines.

According to H. G. Andrews, chief pilot of the new concern, it is expected that with the opening of the state legislature traffic will increase to the point where daily service will be justified.

The plane schedule has been arranged so that the Capital ships will serve as "feeders" for the planes of other transport lines operating from the municipal airport.

Opens Maine Airport

PORTLAND, ME.—Formal opening of the passenger carrying service of the new Portland Airport at Scarboro, was inaugurated with the carrying of 22 persons. Two Fairchild-Curtiss C-6 passenger cabin monoplanes were used.

Will Have Special Air Race Lighting

Sperry, Westinghouse, and B.B.T. Arranging Large Scale Illumination at Mines Field

LOS ANGELES, CALIF.—Mines Field, Los Angeles, scene of the 1928 National Air Races to be held September 8-16, will be one of the best and most completely lighted flying fields in the world during the nine days of flying events, according to a statements by Theodore T. Hull, president of the California Air Race Association

The Sperry, Westinghouse, and B. B. T. lighting companies are now at work on the preliminary details for the installation of every known airport lighting device. Among other lighting features will be the Westinghouse automatic floodlight circuit which is turned on by the sound of a plane's engine overhead. Another feature will be the installation of a Neon tube beacon said to have fog penetrating powers. Powerful arc and incandescent floodlights will complete the layout for the illumination of the mile square field, the grandstands, and the great Exposition Building.

Elaborate plans are said to be under way by several Los Angeles aviation companies to specialize in the night flying of passengers over Mines Field during the period of the races.

Olson Air Lines Buys Mrs. M. Steele's Firm

OMAHA, NEB.—The Steele Air Lines of Omaha were recently sold by Mrs. Margaret Steele and other stockholders for an unannounced consideration to Mr. and Mrs. Allan Olson. The new organization will be known as the Olson Air Lines, Inc. Mr. Olson is president and his wife secretary-treasurer. They are sole owners.

The transaction includes possession of a large airport and school located at Twenty-third and Ernst, in the extreme north part of the city. Plans for numerous improvements of the landing field and erection of additional hangars are under way, according to Olson. He plans to continue the school, offering a strenuous training, including courses in mechanics, meterology and navigation, as well as actual flying.

Since last May Olson has been instructor of flying at the airport which he purchased.

Meet to be Held at South Bend Airport

SOUTH BEND, IND.—Exhibition flying, parachute jumping, balloon strafing and other features will be included in the program of the second air meet of the St. Joseph Valley Aviation Club to be held September 15 and 16 at the municipal airport here. Airplanes from many parts of the country will participate in the events and prizes will be offered for planes coming the longest distance from an established airport having previously been entered in the contest. Prizes will also be given to the first officially entered plane from each state arriving at the airport after September 14.

Events scheduled for the first day of the meet include a stock plane OX-5 race, a dead stick landing contest and a pony express race. Three prizes will be given for each of these events. On the second day a consolation race for OX-5 planes, a balloon strafing contest and a parachute jumping contest will be held, for all of which prizes will be awarded.

Free gasoline and oil will be furnished to planes entering the contests and passenger carrying will be permitted on both days on a commission basis. All planes and pilots entered in the events must be licensed.

Hockaday Conducting Airway Marker Tests

WICHITA, KAN.—Woody Hockaday of Wichita, who spent a personal fortune in marking the highways of the nations, now is engaged in helping to mark the airways. Hockaday has been in Washington several weeks, experimenting with his paint brush and a wide assortment of colors.

On the roof of the Department of Commerce Building aviators now see a strange assortment of airway markers, the work of Hockaday. He is testing out designs submitted at the national airways marking contest in Wichita a few weeks ago. He has the cooperation of the Department of Commerce and each day observers take to the air to study the designs and report on their visibility at various altitudes. Out of the tests is expected to come a standard system of federal airway markings. Col. Harry H. Blee, of the Bureau of Aeronautics, is chairman of the committee supervising the tests.

Jefferson Taking New Field

ROCHESTER, MINN.—Work is to be started at once here on the construction of an airport by the Mayo Properties Association of which Harry J. Harwick is manager. The new field, to be operated by Jefferson Airways, Inc., of Minneapolis, is to have six runways and is to be equipped with both beacon and flood lights. The total cost has been estimated at $150,000.

New Mail Line

Showing the route of the new air mail service between Cleveland and Louisville recently inaugurated by Continental Air Lines, Inc.

Western Air Express Takes Over New Line

SAN DIEGO, CALIF.—Western Air Express announced an expansion program a few days ago under which it assumed operation of the Pacific Marine Airways line between Wilmington and Avalon, Cataline island. This gives to Western Air Express its fourth important air line. The three others are the air mail and passenger line between Los Angeles and Salt Lake City, and de luxe aerial passenger line between Los Angeles and San Francisco and the air mail and passenger line between Pueblo, Colorado Springs, Denver and Cheyenne.

Harris M. Hanshue, president of Western Air Express, in announcing the merger of interests with Pacific Marine Airways, made it known that E. A. Bacon, heretofore president of the company is to remain general manager of the system. It will be known as the Pacific Marine Division of the Western Air Express. For the present the flying boats formerly used by P. M. A. will be used, but it has been announced that W. A. E. will bring in new amphibians.

Notrus Hangars for New Texas Airport

HOUSTON, TEX.—Announcement has been made by Harry E. Weaver of the Notrus Hangar Corp. that the firm has been awarded the contract for two hangars on the airport of W. L. Edwards of Houston. The airport, which is now under construction, occupies a 200 acre tract at the end of the Main Street extension. Edwards has leased the property for 20 years.

Work on the hangars will be started in the near future and the cost of erection will be approximately $10,000.

Dedicate Boeing Field at Seattle

Company's 12-Passenger Transport and Single Place Fighter Exhibited

SEATTLE, WASH.—Boeing Field, Seattle's new municipal airport lying at the city's outskirts, was formally dedicated recently when leaders from all parts of the Northwest gathered to witness the city's outstanding flying spectacle in which a score of pilots representing every service in aviation participated. The dedication honored William E. Boeing, whose work in manufacturing planes and in sponsoring aeronautical endeavor has greatly advanced aviation in the Northwest.

More than 30 aircraft of vary size, among them the tri-engined, 12 passenger Boeing transport, took part in exhibitions. This new Boeing transport was given its first public showing at these ceremonies. It is capable of a speed of 135 m.p.h., with a total weight of plane and cargo of nearly eight tons.

Contrasted with his immense craft, was another new Boeing, the single-place fighter, Wasp powered and capable of a high speed of 185 m.p.h. Lieut. Erik Nelson and Pilot Leslie Tower flew the little speedster.

Service Planes in Ceremonies

Capt. David Logg, U. S. A., air reserve of Seattle, commanded a flight of five Army planes that flew to Seattle from Pearson Field, Vancouver, Wash. He led his group in battle formation and air evolutions. Sand Point Naval Air Station was represented with a dozen machines. Navy land machines were led in maneuvers by Comdr. J. B. Price, commandant at Sand Point, and Chief Aviation Pilot E. E. Dildine.

Among the speakers were Robert S. Boyns, chairman of the aviation committee of the Seattle Chamber of Commerce; Capt. J. V. Hyde, field manager; J. M. Sparkman, chairman of the Board of County Commissioners; Mayor Frank Edwards, Thomas D. Stimson, governor for Washington of the N. A. A., and vice-chairman of the Chamber of Commerce Aviation Committee; and William P. McCracken, Jr., assistant secretary of commerce in charge of aeronautics.

The committee in charge of the air show included Frank M. Fretwell, president Seattle chapter N. A. A., Lieut. Erik Nelson and Lieut. Commander Price. Mr. Stimson was general dedication chairman.

Nine Hangars for Alameda

ALAMEDA, CAL.—Captain C. Thompson, of the Alameda Airport, Inc., has let the contract for construction of the 70 x 100 ft. hangar and eight smaller hangars and work is to begin at once.

Weather Station Chains Organized

Pilots to Receive Forecasts from Points Along Route Before Taking Off

WASHINGTON, D. C.—Weather forecasts and reports to serve pilots along the air routes recently established by the Department of Commerce will be furnished by chains of stations recently established by the U. S. Weather Bureau, according to an announcement made recently by W. R. Gregg, meteorologist in charge of the Aerological Division of the Weather Bureau.

Reports from points of observation along the routes of scheduled flight will be sent to airports where they will be given to pilots about to take off on the route where the observations have been made. Thus the pilot is furnished with current knowledge of the conditions along the airway he is about to traverse. He is also supplied with information regarding weather conditions at the scheduled stops and at points where conditions are likely to induce forced landings.

New Group on West Coast

Most of the weather stations recently organized are along the San Diego-Seattle route. Major stations have been established at the airports at Los Angeles and Oakland, Calif.; Portland, Ore., and Seattle, Wash. Service is to be supplied from the city offices instead of the airports at first order weather stations at San Diego, Fresno, Red Bluff, and Reading, Calif.; Medford and Roseburg, Ore., and Tacoma, Wash.

Secondary stations have been equipped for air service at the following points: Ocean Side Mount Wilson, Saugis, Sandburg, Lebec, Grapevine, Baker's Field, Visalia, Livermore, Winters, Delta, Mount Shasta and Montague, Calif.; Sexton Mountain, Wolf Creek, Yontalla, Eugene, Salem, and Oregon City, Ore. and Castle Rock and Chehalis, Wash. This group of stations report the surface conditions such as temperature, air pressure, wind, visibility and ceiling. All of them report to the more important stations in advance of scheduled flights. For the San Diego-Seattle route airway forecasts are made from San Francisco.

Reports for Mail Lines

Weather stations have also been organized to supply reports for the new airways between Cleveland and Louisville, Atlanta and New Orleans, Chicago and Lincoln and Chicago and Kalamazoo. Reporting stations of the first order for the Cleveland-Louisville route were organized at Columbus, Dayton and Cincinnati, O. Weather stations of the second order were established for this route at Akron, O., and Dam N. 39 on the Ohio River.

First order stations for the Atlanta-New Orleans route were established at Birmingham and Mobile and stations for the Chicago-Lincoln Airway were organized at Cedar City and Des Moines, Iowa and Omaha, Neb. For the Chicago-Kalamazoo route stations were organized at Detroit, Bay City and Muskegon, Mich.

Embry-Riddle, Stout Open Line

CINCINNATI, O.—Week end passenger service between Detroit and Cincinnati has been inaugurated by the Embry-Riddle Co. of this city and the Stout Air Services using a Ford Trimotor plane.

The plane leaves Detroit each Saturday afternoon, reaching Cincinnati about three hours later. Returning, it leaves Lunken Airport here at 9:30 Monday morning. The fare each way is $35 and the round trip $65.

During its stay in Cincinnati, the plane is flown on day and night trips over the city from Lunken Airport. The first trip proved exceptionally favorable for this flying because of fine visibility. The plane carried upwards of 200 passengers, in spite of limited preliminary publicity.

New Buildings Opened By Oklahoma Company

OKLAHOMA CITY, OKLA.—Several hundred persons attended the recent opening of the eight plane hangar, shops and offices of the Oklahoma Air Transport Co., on the municipal airport The company has removed its offices from Norman to Oklahoma City and is now in a position to offer commercial service including cross country flights, instruction and storage of planes. A complete repair shop with skilled mechanics in attendance is also at the disposal of visiting flyers.

B. S. "Cheebie" Graham is president of the company, which is incorporated for $50,000 capital stock and holds the local American Eagle Airplane agency. Roy O. Hunt, Norman automobile man, is vice president and James G. Haizlip is chief pilot.

L.A. Taking Mines Field

LOS ANGELES, CALIF.—Mines Field, which will be the scene of the 1928 National Air Races here September 8-16, has been definitely selected by the city council as the future Los Angeles Municipal Airport.

The city will take formal possession of the field on October 1 under the terms of a 10 yr. lease which provides that the city shall pay a rent of $96,000 for the first year, and $124,800 per year for nine years thereafter.

Many Attend Meet at Marion Field Opening

MARION, IND.—Marion dedicated its municipal airport recently while a crowd estimated at 28,000 persons looked on. Stunt flights, airplane races, parachute jumping for a mark, and a fireworks display at night furnished entertainment. The dedication exercises and air circus were arranged by the Junior Association of Commerce. Through the efforts of this organization the field was obtained a month ago by popular subscription.

Presenting Paul Payne, director of the port, witih a horseshoe attached to a fleet of small balloons and wishing good luck to the flying field, Adjutant General William Kershner, commanding officer of the Indiana National Guard, formally dedicated the field and started the activities of the day. Payne tossed the balloons to the winds and they floated away over the field carrying with them the token of good luck. Three Army planes from Wright Field at Dayton were present to assist in the dedication day activities.

Freddie Lund, test pilot for the Waco Company, won the 30 mi. air race. He was followed in by Paul Holbrock of Sweebrock Field of Ft. Wayne flying a Waco 9, and Harold C. Brooks, of Hoosier Airport at Indianapolis, piloting a Travel Air.

Freddie Cole of Troy, O., won the parachute jumping contest. Marvin Blansett of Anderson, Ind., was second, and Everett White, of Elwood, Ind., won third.

W.A.E. in New Plane And Steamer Service

LOS ANGELES, CALIF.—An aircraft and steamship transportation tieup has been announced by officials of the Western Air Express, Inc., Los Angeles. Under the new plan round trip tickets will be sold between Los Angeles and San Francisco, the purchaser to travel either way by air and return by boat. The new Fokker F-10 monoplanes wil provide the aerial service while either the *Harvard* or *Yale*, coastwise steamers of the Los Angeles Steamship Co., will be utilized for the water trip.

The new service provides a plane each way daily while the steamers make four round trips weekly. Accommodations will include automobile transportation to and from the airport and luncheon served in the plane. The round trip fare is to be $65.

To Start New Dakota Line

RAPID CITY, S. D.—Planes will be operated over the newly christened Mindakota Skyway from Rapid City to Lacrosse on regular schedules this fall Walter Haley, head of the Rapid Air Lines, Inc., announces.

Dedicate Municipal Airport at Akron, O.

AKRON, OHIO.—Formal dedication of Fulton Field as Akron's new municipal airport took place recently in connection with the inauguration of service on the new Cleveland-Louisville air mail line of the Continental Air Lines, Inc.

Dedication ceremonies included short talks by Mayor G. Lloyd Weil of Akron, Postmaster Lloyd Carter, and C. W' Seiberling. Pilots William McConnell, Ross Arnold, and Jesse Hart, who will operate the three Whirlwind powered Travel Air biplanes over the route, were introduced.

Formerly Akron air mail had to be transported to Cleveland by rail, a condition which caused considerable loss of time. Now the two cities are approximately 25 min. apart, by air.

Planes leave Cleveland at 4:30 A.M., and start from Louisville on the return trip at 3 P.M., five and one-half hours being required each way for the 345-mile trip. As soon as the placing of beacon lights along the route has been completed by the Department of Commerce, a revision of schedule will take place.

Van Vechten Invents Wind Direction Light

KANSAS CITY, MO.—A new light has been perfected by Edgar Van Vechten, assistant field manager of National Air Transport, Inc., at Kansas City. The light is T-shaped, 18 x 8 ft. in size, and is placed on a swivel with a fin to make it indicate wind direction. The light is a brilliant red.

The light was perfected by Van Vechten as the result of a recent night trip by plane from Chicago. A slight fog hung over the Kansas City airport when the plane arrived and Van Vechten and the pilot were unable to see the wind cone. A bright red electric sign near the airport, however, could be seen. Taking the cue from the red lights Van Vechten perfected the light wind-indicator. He has applied for patents. Pilots who have tried out the light say it is effective.

Maine Association Formed

ROCKLAND, ME.—Plans for a $100,000 Class A or B airport have received initial impetus here with the formation of the Maine Coast Airport Association with view toward incorporation in the near future. Captain George Snow, Rockland aviator, has been chosen president of the organization and upon him will fall the work of choosing a suitable location somewhere in Knox county for the proposed project. A pledge of $10,000 has already been forwarded by Walter J. Rich, New York business man.

N. A. T. Building Radio Stations

WICHITA, KAN. — National Air Transport, Inc., operating several air mail, passenger and express routes, is building a radio station at the municipal airport here. It will be used for communicating with flying fields between Chicago and Dallas on the Southwest route. It will use a wave length suitable for broadcasting weather reports and dispatching mail planes.

The Kansas City airport will also have a short wave radio station. Similar stations are being placed in operation by the Department of Commerce in Ponca City, Okla., Oklahoma City, Unionville, Mo., Chicago and Moline, Ill. The stations are being installed by T. C. Gale, radio engineer of the Department of Commerce, and E. W. Proctor, engineer for National Air Transport, Inc.

To Dedicate Field At Uniontown, Pa.

UNIONTOWN, PA.—Ceremonies to mark the dedication of the new 100 acre flying field here will take place August 23 and 24 and will be sponsored by the American Legion.

The program for the first day includes registration of pilots and planes, army maneuvers, lunch for visiting pilots, dedication of field to the late Floyd Bennett, balloon strafing contest, free for all bombing contest for visiting pilots using 5 lb. sacks of flour, aerial fireworks display, aerial acrobatics parachute contest, $3,000 fireworks display and banquet for visiting pilots at the Uniontown Country Club. On August 24 the program will include a 25 mile race for OX-5 powered planes and a 50 mi. free for all race. Cash prizes will be given for both of these events.

P. & W. Leases Plot

HARTFORD, CONN.—Due to the increasing demands for fitting and work at Brainard Field, the Pratt & Whitney Aircraft Co. have recently leased an additional plot upon which they expect to erect a brick and steel hangar 100 x 100 ft. The plot has been secured upon the regular terms offered by the standard lease used by the Hartford Aviation Commission in renting space on the City property at the edge of the field. These leases run for a total term of 20 yr. and affords the unexcelled facilities of Brainard Field to the lessee.

New Field in Milwaukee

WATERTOWN, WIS.—Albert Padag and Warren House of Kenosha, Wis., have opened a flying field on So. 22nd Ave., and will conduct passenger flights.

Reports Trip of New Travel Air

O. G. Harned Visited 18 Cities and Took 700 On Flights

WICHITA, KAN.—O. G. Harned, sales manager of the Travel Air Manufacturing Co. here, has made public a report of his recently completed demonstration tour of the new model Travel Air cabin monoplane. Harned visited Des Moines, Minneapolis, Madison, Chicago, Detroit, Buffalo, Syracuse, Albany, Boston, New York, Cleveland, Cincinnati, Indianapolis, and St. Louis in the plane, the trip consuming the greater part of a month.

At least 700 passengers were taken on demonstration flights, Harned said, with capacity loads of six persons in every instance, and now and then seven, as was the case in a number of flights at the Boston Airport. The plane was reported to have borne its loads with ease. On the occasion of the trip from Minneapolis to Madison, a total load of passengers and baggage reaching 1,300 lb. was taken off the field with only a short run.

In checking up the log upon the return of the plane to Wichita, Harned found the average speed to be more than 100 m.p.h., with fuel consumption less than 11 gal. per hour. Maximum loads of passengers and baggage were carried in practically every instance from city to city, not only in the nature of a demonstration trip, but in order that the characteristics of performance of the monoplane might be carefully observed and checked under all operating conditions.

Omaha Field to Have Individual Hangars

OMAHA, NEB.—City Commissioner Noyes announced recently that private hangars to house one plane each may be erected soon at the municipal airport. In commenting on this Mr. Noyes said, "We have had many requests for private hangars from persons who do not care to house their planes with others. We are working out a plan whereby the one-plane garages will be erected by a private company, which will accept the rent as payments, the ownership to rest finally with the city."

Opening New Western Line

BOISE, IDAHO—A new aerial transport company, the Boise Flying Service, is now establishing a daily passenger service to Walla Walla, Wash. At the latter point air travellers may make connections through to Portland, Ore., via "Tex" Rankin's Yakima-Portland service. The new firm is now building a hangar at the local airport which will serve as an operating base.

FOREIGN ACTIVITIES

New British War Plane Developed

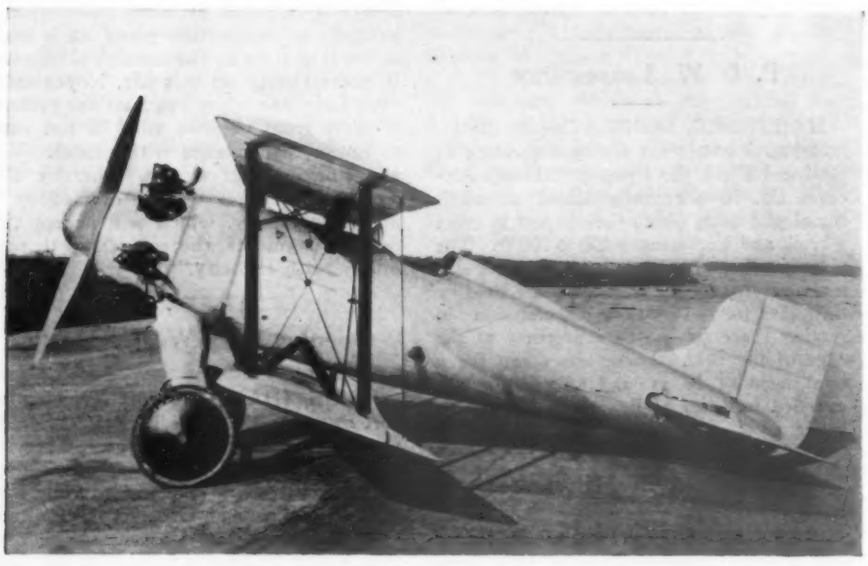
Blackburn Co. of Leeds Building "Lincock" Fighter for Air Ministry

LEEDS, ENGLAND.—A new type of light single-seater fighter biplane is being produced for the British Air Ministry by the Blackburn Aeroplane and Motor Co., Ltd. This airplane has been designed to perform the same service as the heavier and higher powered planes of its type. The power plant is a seven-cylinder Armstrong-iddeley "Lynx" radial engine developing 180-210 hp.

The Blackburn "Lincock," as it is called by the manufacturers, is similar in performance and superior in maneuverability to the heavier single-seater figfhters now in use by the British Air Ministry. It is therefore well adapted to all purposes for which the larger planes are used and has the advantage of an appreciably lower production and operating cost. It is also useful as an economical means of training advanced student pilots. The Lincock may be adapted advantageously to certain civic uses, such as fast mail carrying or police work.

The Lincook is available in either all-metal or composite construction, a simple structure of extreme lightness and durability being obtained in either case. High performance has been obtained by extreme care in eliminating interference between the various units and producing a clean design. The fuselage is well rounded and both upper and lower wings are attached to it by means of struts. A door streamlined into the side of the fuselage affords access to a large compartment which may be used for the storage of military equipment. Abaft this compartment is the cockpit. Efficiency of the plane is increased by ample streamlining of all units.

Concentration of the principal loads such as engine, pilot and military equipment as near as possible to the center of pressure and careful proportioning of the control surfaces contribute much to the exceptional maneuverability. The accessibility of all units and particularly the power plant is a feature which insures economical maintenance.



Side view of new Blackburn "Lincock" light single place fighter biplane built for the Air Ministry.

Col. Fitzmaurice Joins Lloyd Line

DUBLIN, IRELAND.—According to reports here, Colonel James C. Fitzmaurice, who crossed the Atlantic in the Junkers monoplane Bremen with Captain Koehl and Baron von Huenefeld, has signed a contract with the North German Lloyd Steamship Co. to pilot a plane in mail and passenger service between German ports and ships one day at sea. This ship-to-shore service is to begin late this fall or early in spring, it is said. The trans-Atlantic flier was recently promoted from major to colonel of the Free State Air Forces.

Civil Plane Production Championed in Italy

ROME, ITALY—Senator Ancona and others recently drew attention in a Senate discussion to the fact that while all military planes of the Kingdom are manufactured in Italy, very few of the commercial craft are produced here. Germany was named as the chief source of supply of the imported commercial planes, the preferred type being the Junkers. The discussion was occasioned by the proposed aeronautical budget, the senators championing the cause of Italian commercial plane manufacture.

At present, three Italian lines operate airplanes made in Italy. A Savoia is used by the Calgary air line, while the Trieste-Turin route and the Trieste-Zara line employ the Cant seaplane, a large craft manufactured by the Cantiere Navale Triestino di Monfalcone. One of the latter planes was recently used to convey foreign attaches on De Pinedo's flight of 61 airplanes to Spain and France.

Completes Commercial Airport in Canal Zone

BALBOA, CANAL ZONE. — The United Fruit Co. has just completed the first commercial air field in Panama. The field is at Prodeso, near the Costa Rican border 200 mi. from this city.

Col. Arthur Fisher, commanding officer of France Field, has pronounced the field satisfactory for the landing of any type of plane. This announcement was made after a visit of Army airplanes from France Field.

The United Fruit Co., which is developing large banana plantations along the west coast of Panama, is interested in the commercial service line established by the Pan-Rican Airways. This line supplies air service between the United States and Panama and the new field will serve as an emergency airport for these flights.

Designs Floating Mail Sack

PARIS, FRANCE.—Cork composition has been employed in the design of a new mail sack brought out by a French invenor. By pulling a release wire, pilots of mail planes may drop the new type floating water-proof bag to the surface of a body of water as they pass. Postal employees pick the bag up as the flier continues to the next mail station.

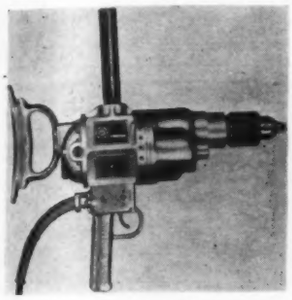
Paris-Biarritz Line Opened

PARIS, FRANCE—A summer month air feature recently opened is a new line between Paris and Biarritz.

THE BUYER'S LOG BOOK

Black & Decker Drill

ONE OF the most important tools in the hangar or airport machine shop is the electric drill. The Black & Decker Mfg. Co., Townson, Md., is producing a ball bearing type suitable for drilling holes up to ½ in. in steel. The drill is constructed with a motor having an idling speed of 400 r.p.m. Its low spindle speed and great power make it an ideal tool for general work. The drill is light in weight, very easy to handle and has such power that it cannot even be stalled with the use of a bench drill stand when working at its maximum capacity in steel.

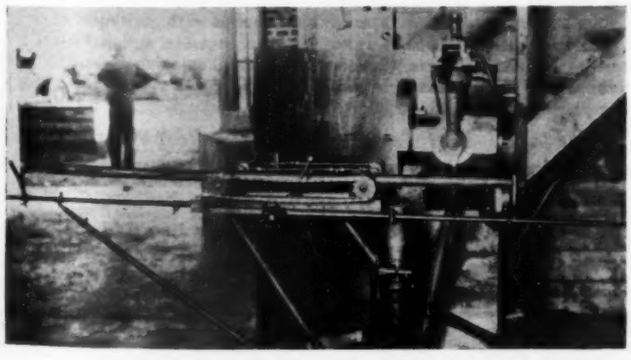


A Black & Decker drill.

The drill is furnished complete with cable, attachment plug and three jawed gear chuck. A three wire cable permitting ground connection can also be supplied. Motors for this tool can be supplied for all standard voltages.

De Walt Metal Cutter

GREATLY INCREASED production has been made possible in many airplane factories by the use of the De Walt "Wonder Worker" for wood working or steel tube cutting. The "Wonder Worker" is an electrically driven saw with overhead control, motor fitted in yoke and direct drive power. The cross arm swings in a complete circle, the motor raises lowers or tilts to any angle making it possible to make angle cuts more accurately and quickly than by any other method. It is manufactured by the De Walt Products Co., which has general offices and factory in Leola, Pa., and sales and service branches in all principal cities.

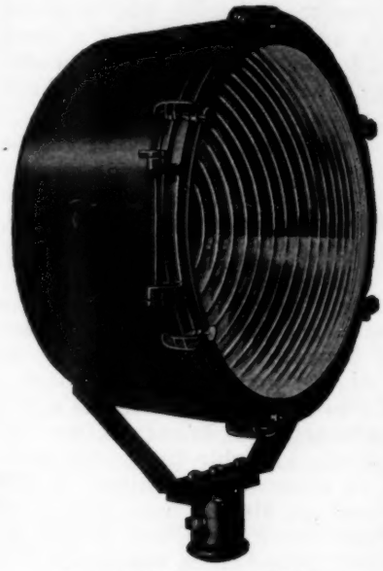


De Walt Wonder Worker installed in factory.

The "Wonder Worker" is built in several models with various sizes of saw blade. For cutting aircraft steel tubing a 12 in. hollow ground fine tooth metal saw is preferable. A special hand rachet feeding device causes the saw to move rapidly through the metal.

Airport Floodlight

THE CROUSE-Hinds Co. of Syracuse, N. Y., has developed a new 3000 watt airport floodlight having a 25" precision type parabolic glass reflector and a cast aluminum alloy housing. This floodlight is designed to give a narrow vertical distribution and a wide horizontal spread which can be varied from 40° to 80° by the use of various spread lenses.



Crouse-Hinds floodlight.

This floodlight is equipped with a set of louvres which eliminate the spill light above the horizontal which would otherwise be blinding to an aviator. It is painted in black and chrome yellow stripes to make it more visible in the daytime. This floodlight will accommodate either the 1500 watt 32 volt lamp or the 3000 watt 32 volt lamp and can be focused in the daytime without the use of special tools or equipment.

A group of these floodlights with the lenses selected to give the proper light distribution will light effectively and economically any type airport and provides a system which is safe and reliable as well as economical to maintain.

Hanna Riveting Machine

THE INCREASING use of duralumin riveting in aircraft construction has led to the development of a special riveting machine for this purpose by the Hanna Engineering Works, of 1765 Elston Ave., Chicago, Ill.

The Hanna Riveter has a reach of 48 in., a 10 in. gap and a 1½ in. die stroke and when operated at 100 lbs. air pressure, is capable of driving ¼ in. duralumin rivets. The possible ram speed is 60 strokes per min. The pressure exerted by the ram is predetermined and its uniform pressure for a considerable portion of its stroke results in perfectly driven rivets.

With the machine arranged dies vertical and cylinder down, the rivets are headed on the under side. Rivets may be inserted well in advance of the riveting, interruptions to insert rivets are reduced to a minimum and consequently the operation of the riveter becomes almost continuous.

The riveter is operated by a foot actuated valve leaving the workman's hands free to handle the work. This equipment is being offered in a wide range of sizes for either portable or stationary use.

Blue Printing Machine

THE PEASE Peerless Blue Printing Machine, manufactured by the C. F. Pease Co., 813-821 N. Franklin St., Chicago, Ill., has been designed for use where it is necessary to produce a large quantity of blue prints at the lowest possible cost for operation and maintenance. It is a valuable asset in the designing department of an aircraft factory or school and is so quiet and free from dirt in operation that it is often installed in a corner of the drafting room.

One departure in blue printing machine design found in the Pease Peerless is the method in which the tracings are fed into the machine and returned to the operator. They are fed upward past a bank of lamps and returned to the tracing tray at the operator's hand instead of being fed out of the back of the machine.

The framework is so rigid that the machine can be shipped completely assembled except for the tracing table. Each machine is adjusted before leaving the factory and is ready for use as soon as it is uncrated. The machine without the table will pass through any ordinary door.

Printing speed of the Pease Peerless machine is from 4 to 6 ft. per min. and is regulated by means of a rheostat placed beneath the feeding table at the right hand side of the machine and connected by sprockets and chain to a dial just above the table. The output is approximately 120 linear yd. per hr. when wired for 220 volts. A double cut worm gearing can be supplied to increase the output to 200 yd. per hr. The machine can also be furnished wired for 110 volts. The Pease Peerless machine is made in four sizes for paper 30, 42, 54 and 66 in. wide.

The Elias "Aircoupe"

(*Continued from page 477*)

rudder post through 180 degrees and can be made steerable. The stabilizer is stationary and no adjustment is required as the entire useful load is close to the center of gravity. The fin is adjustable on the ground.

The gasoline tank is located above the wing giving full gravity feed to the carburetor. The tank has a capacity of 20 gal. which is sufficient for four hours flying at cruising speed. A strainer and water trap is located in a very convenient position where it can be quickly cleaned or drained without removing the cowling. Full gasoline supply to the carburetor is assured at the most extreme angles of flight.

Front quarter view of the Elias "Aircoupe"

Large and conveniently located doors in each side of the fuselage afford easy access to the cabin or cockpit. In the enclosed model the cabin is streamlined into the

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fuselage and the space beneath the fairing is used for a baggage compartment. The seats are side by side and well upholstered. Unobstructed vision is afforded through safety glass windows in the front and large sliding windows in the side doors of the cabin. Stick control and rudder pedals are employed and all pulleys are of bakelite composition and are visible for inspection. The entire control system operates very lightly and is so designed that all slack can be readily taken up. The instruments include an oil pressure guage, oil temperature guage, tachometer and altimeter. Wheel brakes and float type landing gear also can be supplied for this plane.

The general specifications given by the manufacturer are as follows:

Wing Span	28 ft. 1½ in.
Overall length	20 ft. 11 3/32 in.
Overall Height	7 ft. 2 15/32 in.
Chord	84 in.
Landing Gear Tread	7 ft. 3 in.
Wing Area (Including ailerons)	192 sq. ft.
Aileron Area	20.4 sq. ft.
Stabilizer Area	13.2 sq. ft.
Elevator Area	13 sq. ft.
Rudder area	6.5 sq. ft.
Fin Area	3.6 sq. ft.
Weight with 80 h.p. Anzani Engine	870 lb.
Useful load	518 lb.
Wing loading	7 lb. per sq. ft.
Dep't of Commerce Gross Design weight loaded	1388 lb.
Fuel Capacity (Including reserve)	23 gal.
Oil capacity	3 gal.
Performance:	
Maximum speed at sea level	90 m.p.h.
Cruising speed	80 m.p.h.
Landing speed at sea level	30 m.p.h.
Stalling speed	34 m.p.h.
Climb at sea level	590 ft. per min.
Climb in 10 min.	3600 ft.
Service ceiling	10,000 ft.
Cruising range	400 mi.
Fuel consumption at cruising speed	5 gal. per hr.
Oil consumption at cruising speed	0.40 gal. per hr.
Take off in dead calm within	125 ft.
Landing stop in dead calm within	100 ft.

The Merits of Aviation Natural Gasoline

(*Continued from page* 476)

tains no material that will not vaporize at temperatures existing in the intake manifold after the proper amount of heat has been supplied to the air intake if conditions are such that heat is needed at that point. However, a hot spot over which the pilot has full control is not detrimental. Such a hot spot even offers considerable advantage during extremely cold weather, as it enables the pilot to raise the temperature of the engine, thereby insuring the proper circulation of lubricating oil which might otherwise partially congeal so that it would not pass through the screens with sufficient rapidity to properly lubricate the engine. In addition it is very desirable that the engine operate at the temperature recommended by the manufacturer in order that the proper clearance of various parts is not excessive.

Adjustable engine cowling, in the case of air cooled engines, would however, be much more desirable that the intake manifold hot-spot, if one could always be assured of the more volatile natural gasolines. Such cowling would restrict or increase the air flow about the engine

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the
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ALREADY, the new Champion Aviation Spark Plug has conclusively demonstrated that in sheer dependability it has no equal.

The Champion Aviation Spark Plug is entirely new. New in principle. New in design.

Champion has given to aviation the first spark plug specially designed for the distinct type of service demanded by aircraft engines.

The Champion Aviation Spark Plug embodies a dual insulator of exclusive Champion sillimanite. The primary "dome" insulator protects the secondary insulator, while a cooling area separates them.

The entire structure is *so designed that the insulators cannot be broken in such a way as to interfere with engine operation.*

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thereby providing positive operating temperature control.

It may be well to point out that an excessive amount of heat applied to the mixture in the fuel manifold will result in a decided loss of power. This is due to the fact that the mixture is at a much higher temperature when combustion occurs, and since this higher temperature is totally unnecessary in the case of a fuel which is already vaporized, the additional heat simply tends to increase cylinder head and piston temperatures.

It seems to be common practice with users of air cooled engines, to attempt to raise the oil temperature by heating the mixture and raising cylinder head temperatures to an excessive degree. While this does raise the oil temperature, it does so only at the expense of decreased power output and even serious damage to the engine in the more extreme cases.

Not a Strictly Cold Weather Fuel

By specially processing the normal natural gasolines, it has been possible to perfect a fuel possessing many advantages over even the best grades of domestic aviation gasoline. Although the high volatility of this product and its great advantage over domestic aviation gasoline during cold weather operation has been particularly stressed in this article, it is by no means strictly a cold weather fuel. The writer has simply tried to point out that the majority of operators have been obliged to maintain excessive temperatures in the intake manifolds and cylinders of their engines in order to vaporize and burn the fuel which has been available in the past.

A high grade of aviation natural gasoline has inherent anti-knock properties which are considerably better than those of domestic aviation and even equal to some of the highly "doped" fuels. Naturally this feature permits the use of this product in engines of high compression ratio without the addition of anti-knock compounds.

By properly refining and rectifying this product, it has been possible to retain the high gravity and consequent light weight so desirable in aircraft operation, without retaining the high vapor pressure and "wild" material usually associated with gasolines of similar gravity. The higher grades of aviation natural gasolines which are now available are even more stable and desirable for high altitude and hot weather flying than gasolines made to conform to the old domestic aviation specifications.

It should be pointed out, however, that there are a great many different grades of natural gasoline, and that all are not suitable for use as an aviation fuel. Operators should use the same care in selecting this product that they would in buying gasolines with which they are more familiar.

Production Planning and Control

(*Continued from page* 475)

of the drawings, and the Engineering Department should co-operate to secure this.

Standard sheet-sizes should be set, and all drawings, without exception, held to these sizes. It is more economical to waste a few square inches of drawing—or blueprint-paper—than it is to hunt continually through a lot of odd-sized sheets. These sheet-sizes should all be multiples of the smallest. This is commonly 8½ in. x 11 in., "letter-size", although some other sizes have also been used, such as 8½ in. x 14 in. (cap size), 9 in. x 12 in., and 9½ in. x 12 in. (quarter-royal size). Which ever is adopted, no smaller sheet than this should be

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The G-E airport twin floodlight, with a beam spread of 80 degrees in the horizontal plane and only six degrees in the vertical, gives the necessary illumination for landing.

It uses incandescent MAZDA lamps and is, therefore, inherently suited for remote control. Trained operators are not required. Ask the aviation lighting specialist at the nearest G-E sales office.

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Story of Travel Air on request

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The Radio Corporation of America is prepared to analyze and quote prices on modern aircraft equipment of the following types:

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   (a) the plane and the airport ground station via radio telephony, or radio telegraphy, and
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permitted. Small drawings are inconvenient for shop use. Assuming that 8½ in. x 11 in. is the one selected, the list of standard sheets may be designated thus:

Standard Drawing Sizes

Designation	*Dimensions*
A	8½ in. x 11 in.
B	11 in. x 17 in.
C	17 in. x 22 in.
D	22 in. x 34 in.
E	34 in. x 44 in.
F	44 in. x 68 in. (unusual)

Sometimes a few long sheets are desired, such as

G 8½ in. x 22 in. or 11 in. x 34 in.

but no sizes should be standardized unless there is real need for them, and experience shows that these are seldom used. In fact, as multiplicity of drawing-sizes is a nuisance in the shop, it may be desirable to eliminate some of those first given and standardize at the start on only three:

A	8½ in. x 11 in.
C	17 in. x 22 in.
E	34 in. x 44 in.

No hardship will ordinarily be experienced from such a limitation.

So far as possible, but one piece should be shown on a sheet. Except for three-view and assembly drawings, which have to be on large sheets, the smaller and handier sizes should be used. Nine-tenths, or more, of all the work can be put on the smallest, or "A" size.

Part and Drawing Numbers

Every drawing must have a distinctive number, and every piece, part, or assembly which is purchased, made, or kept in stock must also have its number. These are constantly used and very important numbers. Drawing-numbers and Part-numbers may form two independent series, and where the systems of numbering are already well established this is often necessary. Some form of cross-indexing the two is then required. But when possible, it is of the greatest convenience to have the drawing-number and the part-number of a piece the same. This does not mean that every piece or assembly must necessarily have a drawing, or that every drawing must represent some piece or assembly. There may be numbered parts that have no drawings, and numbered drawings that represent something other than parts; but when a numbered part does have a drawing, or a numbered drawing does represent a piece or an assembly, their numbers should, if at all possible, be the same.

Some forethought is necessary in providing a single numbering system that will serve both purposes. Two distinct plans are open for consideration; one the straight, consecutive plan, and the other the classified plan. In the straight, consecutive plan all part and drawing-numbers are taken from one consecutive series, strictly in order, with no attempt to group or classify them. The number carries no meaning whatever, and the same or decription afford no clue to the part or drawing-number. Drawings which happen to be close together in the series of numbers and the files, have no necessary relation to each other, and drawings of related things may be numbered and filed widely apart. A card or similar index is required, arranged according to name or description, in which to look up the numbers of parts and drawings. To be dependable, this must be kept in good shape, preferably by some clerk (not a draftsman or an office-boy) whose special duty it is to assign and record the numbers, arrange the cards, and file the drawings. Notwithstanding all these complications, this is a good and much-used system.

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The power plant in the Avian is the Mark II Cirrus 80-h.p., air-cooled, four cylinders in line, aircraft engine. Specifications and performances on request.

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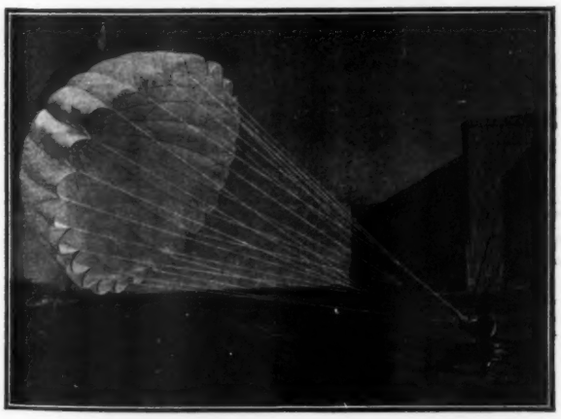

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And small fields are encountered frequently at this time and they will exist for some time. The commercial operator or private owner who flies a Challenger is prepared to meet them.

Challenger OX-5 is manufactured under Approved Type Certificate No. 19. Price $3,100 at factory, complete with instruments. Complete, but less engine, $2,400. Prices subject to change.

KREIDER-REISNER AIRCRAFT CO., Inc.

Hagerstown Challenger **Maryland**

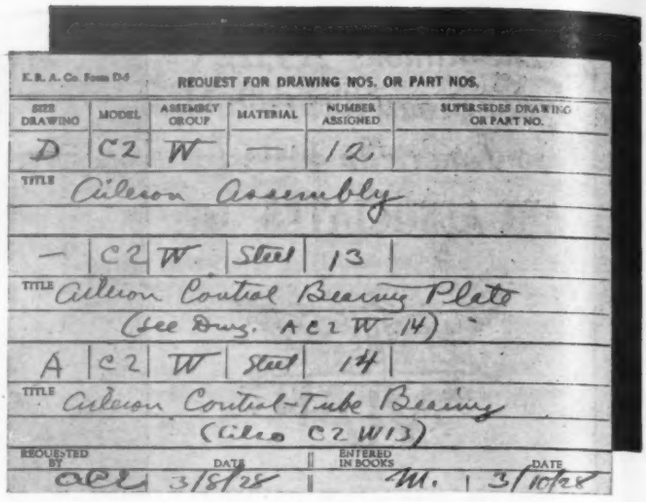
In the classified plan, the part and drawing-numbers carry some meaning regarding the things they signify, usually through the use of a combination of letters and figures. As applied to the airplane, this may be illustrated as follows: Let the character of the thing be represented first, by a letter (as *A* for airplane, *E* for engines, etc.) Then, successively, indicate the model by a number, the assembly-group by a letter (as *F* for fuselage, *W* for wing, etc.), and the specific part by a final number. We then have for the part or drawing-number something like this:

A 10 F 47

meaning Part 47 of the Fuselage of Airplane Model 10. What Part 47 is must be determined by looking it up in the list of parts under Fuselage, *F*. Of course, these parts could be still further classified and the significance of the numbers still further extended. This also is a very good and much used plan.

When applied in plants having a widely diversified line of products in many types and sizes, the succession of letters and numbers in a symbol sometimes becomes long and unwieldy, and in such plants the straight consecutive system is usually preferable; but in industries making only a few lines and models, well-standardized, the classified plan has certain advantages. Such, the airplane and engine industries are, and this plan is well adapted for their use. The principal advantages are, that when the meanings of the letters have become familiar, as they very soon will, the number of a part or drawing conveys instant information as to what it is; no card-index is needed for finding drawings as they are practically self-indexing; the numbers of related parts are close together in the series and their drawings are close together in the files.

Every number assigned to a part, assembly, or drawing must at once be entered in a suitable record book, with a clear description of what it designates. This is preferably



K. B. A. Co. Form D-6 — REQUEST FOR DRAWING NOS. OR PART NOS.

SIZE DRAWING	MODEL	ASSEMBLY GROUP	MATERIAL	NUMBER ASSIGNED	SUPERSEDES DRAWING OR PART NO.
D	C2	W	—	12	
TITLE Aileron Assembly					
—	C2	W	Steel	13	
TITLE Aileron Control Bearing Plate (See Dwg. AC2W14)					
A	C2	W	Steel	14	
TITLE Aileron Control-Tube Bearing (Like C2W13)					

REQUESTED BY: acl — DATE: 3/8/28 — ENTERED IN BOOKS: M. — DATE: 3/10/28

Reproduction of part and drawing number request slips.

a loose-leaf book, and it is usually desirable to write at least two copies and sometimes more. One of these is the working copy of the draftingroom; another should be kept in a separate place as a safeguard against destruction of the first copy by fire. One copy is usually required by the Production Dept., and others may be desired by the Purchasing Dept., or for a record of blueprints issued and withdrawn, etc. A form of this record which has been used in many plants and found well adapted to the purpose is shown at the beginning of this article.

The entries of part and drawing numbers, with their descriptions, are on the left half of the double page. The columns on the right hand half are left blank to be used as desired for any of the purposes indicated above. The

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WIND CONES

These fine quality cones are responsive to the slightest breeze—a fine feature for either private or training fields. Made of material that will not turn dark with age. The end is well sewed to prevent fraying. White cotton; or orange color available by special order. Rust-resisting steel frame. 8 feet long 20 inches diameter. Complete, ready for attachment to upright pipe—

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Airplanes, Flying Boats, Motors, Supplies

Dandy unused J 1 Standard airplane converted to receive Hispano, less motor and motor equipment $900. Unused J-1 Standard with original Hall Scott motor bed, less motor and motor equipment $800. Very moderately used Curtiss JN4D airplane, less motor and motor equipment, $600, or equipped with moderately used excellent condition motor $900. Unused JN4D airplane, dandy condition, less motor and motor equipment $850.

150 H.P. Hispano motored Curtiss N-9 two place seaplane with pontoons, good used condition, $1500.

Curtiss JN unused dandy lower covered wings, $65.00; uppers, $85.00. Canuck upper covered wings, $90.00; lowers, $100. Dandy 26 x 4 unused tires, $6.00; or slightly used, $4.00; or moderately used, $2.50; new tube, $2.25. Dandy unused 750 x 125 tires, $10.00; or unused passable tire, $6.50. Surplus tube, $1.75; or new tube, $3.50. JN4D or Canuck metal wing skids, $2.00 per pair.

All parts for JN4D, Canuck, J-1 Standard, OX5, OXX6 and many Liberty, Hispano, Clerget, LeRhone, Fiat and Lawrance parts.

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THE WINNING WACO WHIRLWIND

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FLYING FIELD
ALEXANDER AIRPORT

record of blueprints issued and withdrawn is one of the most useful of these. Note that this right-hand page is the back of the next succeeding part—and drawing-number page.

When two or more copies are to be made, this should be done by typewriter. In fact, this is by far the best and most legible way to make this important and permanent record. New numbers will then be issued to those requesting them, through the medium of Part—or Drawing-Number Request Slips, made by the requester in duplicate and given to the record clerk. This clerk assigns the number, enters it on both copies of the request, hands one back to the requester, and keeps the other copy for use in typing up the Record Book. After typing, the Requests should be bundled up and kept for a time, as questions are sometimes raised regarding them. The form of such a Request is shown on page 494.

When a part or drawing becomes obsolete or is superseded by another, the fact and the date should be recorded at once in the Record Book, opposite both the superseding and the superseded numbers, in the columns provided.

This concludes the subject of drawings in their relation to the production system. The next subject to be taken up under these heads will be the very important one of Specifications.

The Lincoln-Page

(*Continued from page* 474)

The cockpits are generously upholstered in leather and afford ample space for the comfort of pilot and passengers. The seats are built of aluminum which reduces weight without sacrificing rigidity as they are of one piece and bolted to the fuselage frame. A large baggage compartment is provided in the fuselage at the rear of the pilot's seat and has a capacity of 8 cubic ft. The door to this compartment is built into the rear of the seat affording convenient access. A comfortable headrest is provided for the pilot and is streamlined gracefully into the turtle deck. Large windshields for both cockpits give ample protection to the occupants.

When the plane is to be used for instruction duplicate controls may be installed in the forward cockpit. The rudder, elevators and ailerons are actuated by stranded flexible cables connected directly to the control stick and adjustment of the stabilizer may be made in flight by a simple lever and ratchet arrangement operated from the after cockpit. A double throttle is installed as standard equipment so that the plane may be flown either right or left handed.

Hamilton Propeller Used

Instruments required by the Department of Commerce are furnished and include altimeter, tachometer, thermometer, oil pressure gauge and switch. A Hamilton spinner type propellor is standard equipment, but a Hamilton metal propeller with metal spinner can also be supplied.

Wing tanks are built into the inner bay of each upper panel with plywood fastened above and below the tanks to take the drag load. A wing driven fuel pump is also installed in the upper wing and is completely enclosed with the propeller shaft extending through the leading edge. The wing tanks have a combined capacity of 25 gal. and are so placed as to maintain full gravity feed to the carburetor. Fuel is pumped to them from a 42 gal. fuselage tank and an overflow line leads back to the lower tank. A sight gauge in this line is mounted on one of the center section struts in full view of the pilot. Inspection of the

The Pheasant, manufactured under approved type certificate No. 36, has rapidly gained public favor.

Its high performance, sturdy construction and attractive appearance make it the ideal ship for the commercial operator.

The Pheasant detachable motor mount makes it possible to install any motor desired.

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YOUNG MAN! We challenge you to choose a career which offers more action, greater adventure, better pay and a more golden future than Aviation. Qualify now at Porterfield, where you study airplane construction and all popular motors in one of America's foremost factories. Where you fly in new American Eagles with competent, experienced pilots. And where you study and associate with practical men who are leaders in the industry. Write now for the interesting booklet, "A Flying Message."

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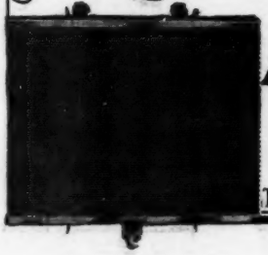

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pump is made possible by a pyralin window in the upper wing.

Landing gear is of the split type and consists of a nickel steel axle supported by chrome molybdenum streamline steel tubing and a rubber cord shock absorber. The axle is streamlined with balsa wood. Standard equipment includes 30x5 straight side tires which give increased riding qualities and longer life.

Specifications as provided by the manufacturer are as follows:

Length overall	23 ft. 2 in.
Span	32 ft. 8½ in.
Height overall	9 ft. 3 in.
Gap	60 in.
Wing cord	58 in.
Wing area	300 sq. ft.
Wing section	Gottingen 436
Wing loading	8.3 lb. per sq. ft.
Power loading	13.9 lb. per h. p.
Weight empty	1,440 lb.
Useful load	1,060 lb.
Pay load	538 lb.
Gross load	2,500 lb.
High speed at sea level	130 m. p. h.
Cruising speed at sea level	110 m. p. h.
Rate of climb at sea level	1000 ft. per min.
Service ceiling	16,000 ft.
Landing speed	48 mi. per hour
Normal cruising range	67 gal gas
Maximum speed	600
Cruising speed	715

Production in the Travel Air Factory

(*Continued from page* 473)

out interfering with the movement of other materials on the main floor, which speeds up production.

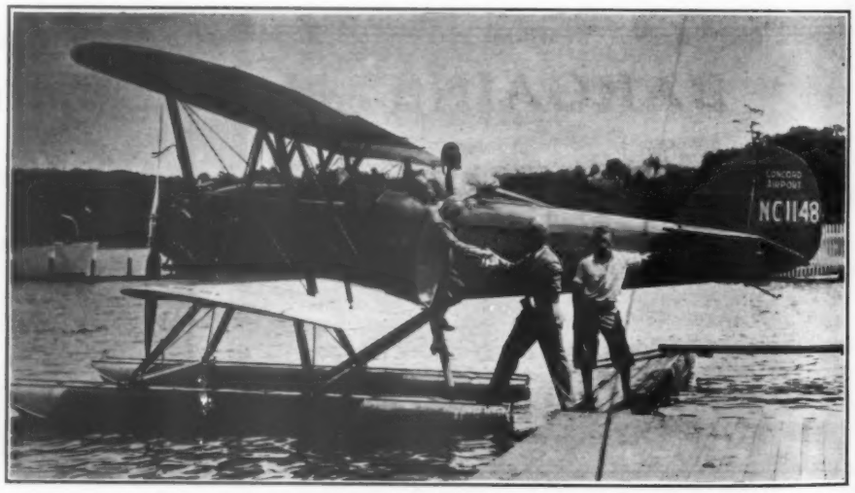
"There is no stoppage of materials from the time they come into the plant until they emerge as a completed airplane," said Walter Beach, president of the Company, in commenting upon the manufacturing plant. "We have no stock of raw materials in storage, and no stock of planes on hand. We are turning out planes on two shifts and are employing more than 275 men. Our planes are being used on five different mail lines. We haven't an opportunity to build for stock. By this arrangement we haven't money tied up in stock of materials or planes. We are not paying interest on 'non-motion'."

View of a section of the wing construction department of the Travel Air factory

Mr. R. S. Fogg about the WACO-EDO Seaplane

MR. R. S. FOGG of The Weirs, N. H., was flying for 10 years and was operating flying boats on Lake Winnipesaukee for five years. He has enough commercial flying experience to choose the right kind of equipment. He has carried over 11,000 passengers without the slightest injury. He realizes that modern safe and efficient equipment is necessary for success of commercial flying. This year he replaced his faithful flying boat by a Waco 10 Seaplane equipped with Edo "De Luxe" floats.

Lake Winnipesaukee is surrounded by mountains. On many a bright sunny day the gusty offshore wind makes it dangerous to operate a wartime flying boat. Now, with the powerful Wright engine in a Waco-Edo Seaplane he can operate in any weather. While the Seaplane carries only two paying passengers against three in a flying boat, Mr. Fogg secures a larger volume of business because of larger number of flying days.



Mr. Fogg finds his Waco-Edo Seaplane very easy to handle on the water. He brings it head on to the inclined platform, where the man is seen standing in the photograph, shuts the engine off and lets the Seaplane slide up the platform until it stops. Then his mechanic pushes it off, and turns the ship around by the wing and tail without going into water. Two passengers disembark, two new ones get in, the pull of the Heywood starter button, and the Seaplane is taxiing again for take-off. The whole operation takes less than a minute.

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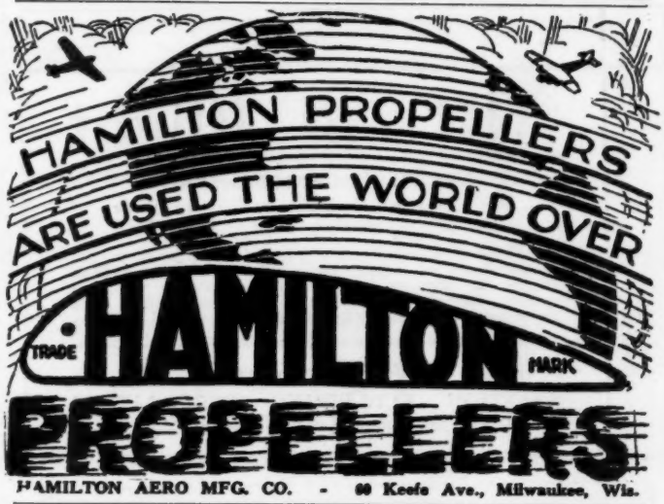

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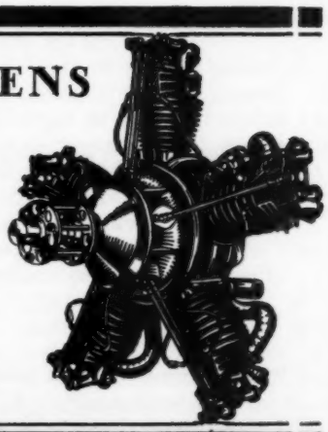

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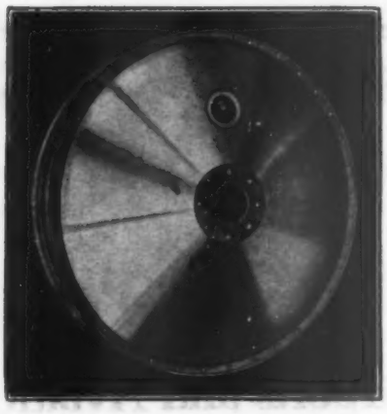

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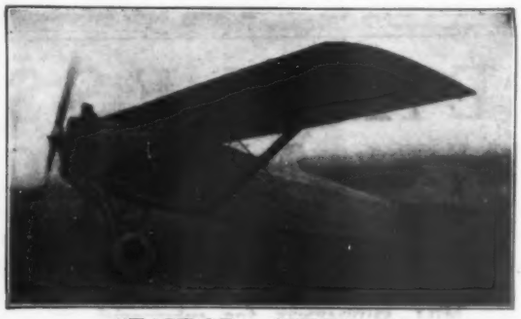

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SIDE SLIPS

By Robert R. Osborn

The newspapers state that signs are being posted in the French air liners warning the passenger to "Wait until the airplane alights." Some other famous signs might be appropriate too, with proper aeronautical revisions, such as "Don't shoot the pilot, he's dong his best." "Look around now and choose your exit. In case of trouble neither run nor walk to that exit. Stay where you are." "All windows must be closed while passing through tunnels." "Passengers dropping off at way stations without parachutes do so at their own risk."

* * *

Another indication that big business methods are beginning to be used in aviation, is the announcement that the Aeronautical Chamber of Commerce will be decentralized and that offices will be opened up in various parts of the country with vice-presidents in charge of each. Before the Chamber can hope to compete with some of our large banks and insurance companies, however, it will have to have a vice-president in each town of five thousand or more population.

* * *

The Intrepid Aviator wandered in this afternoon to borrow a pack of cigarettes, one cigarette at a time, and said that a lot of people with ambitious ideas have certainly come into aviation in this recent boom, and he heard only the other day of a newly-formed flying school which was going to order a couple of Beardmore Inflexibles for student instruction.

* * *

In a recent article in the *New York World* a lady writer, Miss Elsie McCormick, discussed inferiority complexes, and their origins and cures. In it we find the statements: "There are some occupations, however, which are very helpful in reducing the size of one's burden of inferiority. It is an affliction almost absent from the lives of truck drivers, airplane pilots, and locomotive engineers. Anybody who directs a dangerous and rapidly going vehicle gets a sense of power that a thousand social snubs can't remove."

The only possible solution we can see for any such opinions as these having developed in the lady's mind is that the lady didn't investigate thoroughly the credentials of the "pilots" she found to be so devoid of inferiority complexes. If they were wearing bright new goggles, shiny helmets with "Wings" streamers attached thereto, leather jackets, whipcord breeches and leather riding boots, them wasn't airplane pilots, lady, them was students, newly made.

* * *

Speaking of lady drivers, as we were a few issues ago, the famous "Bill" Winston told us today that his wife had driven their car so hard into the back of a Chevrolet that it cost him seventeen dollars to repair the car which had been ahead of the Chevrolet.

* * *

If there are ever any mysterious murders in the vicinity of Curtiss Field on Long Island, New York, we can offer the detectives assigned to the case a possible clue. Whenever the wind is from the west the planes have to taxi to the far end of the field to take off over the hangars. After he has gotten the plane out there and turns around for the take-off, the pilot is asked by four out of five passengers, "Going to try again? Think you'll have better luck at getting off in this direction?"

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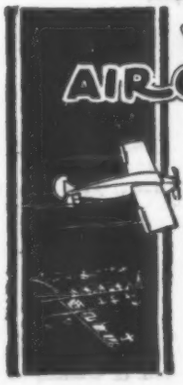

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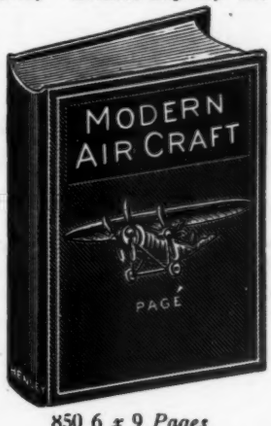

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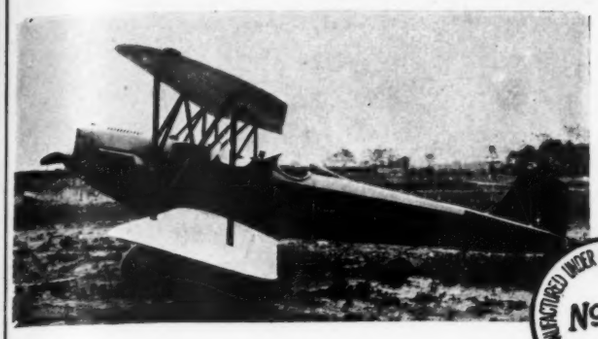

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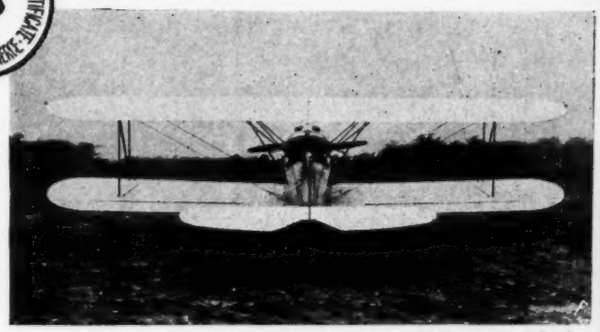

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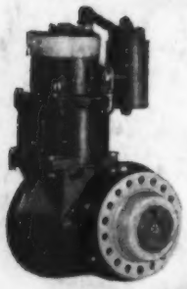

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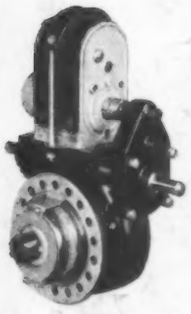

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